



## ENVIRONMENTAL PROTECTION AGENCY

### 40 CFR Part 63

[EPA-HQ-OAR-2020-0430; FRL-7522-01-OAR]

RIN 2060-AU63

### National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule.

**SUMMARY:** This proposal presents the results of the U.S. Environmental Protection Agency's (EPA's) residual risk and technology review (RTR) for the National Emission Standards for Hazardous Air Pollutants (NESHAP) for major source Primary Copper Smelters as required under the Clean Air Act (CAA). Pursuant to the CAA, this action also presents the results of the technology review for the Primary Copper Smelting area source NESHAP. The EPA is proposing new emissions standards in the major source NESHAP. The EPA is also proposing to remove exemptions for periods of startup, shutdown, and malfunction (SSM) and specify that the emission standards apply at all times and require electronic reporting of performance test results and notification of compliance reports.

**DATES:** *Comments.* Comments must be received on or before **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

*Public hearing.* If anyone contacts us requesting a public hearing on or before **[INSERT DATE 5 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA will hold a virtual public hearing. See **SUPPLEMENTARY INFORMATION** for information on requesting and registering for a public hearing.

**ADDRESSES:** You may send comments, identified by Docket ID No. EPA-HQ-OAR-2020-0430, by any of the following methods:

- Federal eRulemaking Portal: <https://www.regulations.gov/> (our preferred method).  
Follow the online instructions for submitting comments.
- Email: [a-and-r-docket@epa.gov](mailto:a-and-r-docket@epa.gov). Include Docket ID No. EPA-HQ-OAR-2020-0430 in the subject line of the message.
- Fax: (202) 566-9744. Attention Docket ID No. EPA-HQ-OAR-2020-0430.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Docket ID No. EPA-HQ-OAR-2020-0430, Mail Code 28221T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand/Courier Delivery: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operation are 8:30 a.m. – 4:30 p.m., Monday – Friday (except federal holidays).

*Instructions:* All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to <https://www.regulations.gov/>, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document. Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will

continue to provide remote customer service via email, phone, and webform. The EPA encourages the public to submit comments via <https://www.regulations.gov/> or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only. For further information on EPA Docket Center services and the current status, please visit us online at <https://www.epa.gov/dockets>.

**FOR FURTHER INFORMATION CONTACT:** For questions about this proposed action, contact Tonisha Dawson, Sector Policies and Programs Division (D243-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-1454; fax number: (919) 541-4991; and email address: [dawson.tonisha@epa.gov](mailto:dawson.tonisha@epa.gov). For specific information regarding the risk modeling methodology, contact James Hirtz, Health and Environmental Impacts Division (C539-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-0881; fax number: (919) 541-4991; and email address: [hirtz.james@epa.gov](mailto:hirtz.james@epa.gov).

**SUPPLEMENTARY INFORMATION:**

*Executive Summary.* This proposal presents the results of the EPA's residual risk and technology review (RTR) for the NESHAP for major source Primary Copper Smelters as required under the CAA. Pursuant to the CAA, this action also presents the results of the technology review for the Primary Copper Smelting area source NESHAP.

Based on the results of the risk review, the EPA is proposing that risks from emissions of air toxics from this major source category are unacceptable. The EPA also completed a demographic analysis which indicates that elevated cancer risks associated with emissions from the major source category disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities. To address these risks, the EPA is proposing new emissions standards in the major

source NESHAP, which will reduce risks to an acceptable level, and is also proposing work practice standards to provide an ample margin of safety to protect public health.

The EPA is also proposing new emissions standards for the major source NESHAP to address currently unregulated emissions of hazardous air pollutants (HAP), as follows: particulate matter (PM), as a surrogate for particulate HAP metals, for anode refining furnace point source emissions; and PM for roofline emissions from anode refining furnaces, smelting furnaces, and converters. EPA is also proposing new emission standards for mercury emissions from any combination of stacks from dryers, converters, anode refining furnaces, and smelting furnaces. The EPA is proposing test methods for roofline PM emissions and amending the test methods to incorporate by reference three voluntary consensus standards (VCS).

Under the technology review, the EPA identified no developments in practices, processes, or control technologies to achieve further emissions reductions beyond the controls and reductions proposed under the risk review for major sources. With regard to primary copper smelting area sources, the Agency did not identify any developments in practices, processes, or control technologies.

The EPA is also proposing to remove exemptions for periods of startup, shutdown, and malfunction (SSM) and specify that the emission standards apply at all times and require electronic reporting of performance test results and notification of compliance reports. Implementation of these proposed rules is expected to reduce HAP metal emissions from primary copper smelters, improve human health, and reduce environmental impacts associated with those emissions.

*Participation in virtual public hearing.* Please note that the EPA is deviating from its typical approach for public hearings because the President has declared a national emergency. Due to the current Centers for Disease Control and Prevention (CDC) recommendations, as well as state and local orders for social distancing to limit the spread of COVID-19, the EPA cannot hold in-person public meetings at this time.

To request a virtual public hearing, contact the public hearing team at (888) 372-8699 or by email at [SPPDpublichearing@epa.gov](mailto:SPPDpublichearing@epa.gov). If requested, the virtual hearing will be held on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The hearing will convene at 9:00 a.m. Eastern Time (ET) and will conclude at 3:00 p.m. ET. The EPA may close a session 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. The EPA will announce further details at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air>.

The EPA will begin pre-registering speakers for the hearing upon publication of this document in the *Federal Register*. To register to speak at the virtual hearing, please use the online registration form available at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air> or contact the public hearing team at (888) 372-8699 or by email at [SPPDpublichearing@epa.gov](mailto:SPPDpublichearing@epa.gov). The last day to pre-register to speak at the hearing will be **[INSERT DATE 12 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Prior to the hearing, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air>.

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to [dawson.tonisha@epa.gov](mailto:dawson.tonisha@epa.gov). The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air>. While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact the public hearing team at (888) 372-8699 or by email at [SPPDpublichearing@epa.gov](mailto:SPPDpublichearing@epa.gov) to determine if there are any updates. The EPA does not intend to publish a document in the *Federal Register* announcing updates.

If you require the services of a translator or a special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by **[INSERT DATE 7 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA may not be able to arrange accommodations without advanced notice.

*Docket.* The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2020-0430. All documents in the docket are listed in <https://www.regulations.gov/>. Although listed, some information is not publicly available, *e.g.*, Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy. With the exception of such material, publicly available docket materials are available electronically in Regulations.gov.

*Instructions.* Direct your comments to Docket ID No. EPA-HQ-OAR-2020-0430. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <https://www.regulations.gov/>, including any personal information provided, unless the comment includes information claimed to be CBI or other information whose disclosure is restricted by statute. Do not submit electronically any

information that you consider to be CBI or other information whose disclosure is restricted by statute. This type of information should be submitted by mail as discussed below.

The EPA may publish any comment received to its public docket. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <https://www.epa.gov/dockets/commenting-epa-dockets>.

The <https://www.regulations.gov/> website allows you to submit your comment anonymously, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through <https://www.regulations.gov/>, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any digital storage media you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at <https://www.epa.gov/dockets>.

The EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. The EPA encourages the public to submit comments via <https://www.regulations.gov/> as there

may be a delay in processing mail and faxes. Hand deliveries or couriers will be received by scheduled appointment only. For further information and updates on EPA Docket Center services, please visit us online at <https://www.epa.gov/dockets>.

The EPA continues to carefully and continuously monitor information from the CDC, local area health departments, and our Federal partners so that the Agency can respond rapidly as conditions change regarding COVID-19.

*Submitting CBI.* Do not submit information containing CBI to the EPA through <https://www.regulations.gov/> or email. Clearly mark all of the information that you claim to be CBI. For CBI information on any digital storage media that you mail to the EPA, mark the outside of the digital storage media as CBI and then identify electronically within the digital storage media the specific information that is claimed as CBI. In addition to one complete version of the comments that includes information claimed as CBI, you must submit a copy of the comments that does not contain the information claimed as CBI directly to the public docket through the procedures outlined in *Instructions* above. If you submit any digital storage media that does not contain CBI, mark the outside of the digital storage media clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and the EPA's electronic public docket without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 Code of Federal Regulations (CFR) part 2. Send or deliver information identified as CBI only to the following address: Office of Air Quality Planning and Standards Document Control Officer (C404-02), OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention Docket ID No. EPA-HQ-OAR-2020-0430. Note that written comments containing CBI and submitted by mail may be delayed and no hand deliveries will be accepted.

*Preamble acronyms and abbreviations.* The Agency uses multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:



ACI	activated carbon injection
AEGL	acute exposure guideline level
AERMOD	air dispersion model used by the HEM-4 model
BTF	beyond-the-floor
CAA	Clean Air Act
CalEPA	California EPA
CBI	Confidential Business Information
CFR	Code of Federal Regulations
mg/dscm	milligrams per dry standard cubic meter
ECHO	Enforcement and Compliance History Online
EPA	Environmental Protection Agency
ERPG	emergency response planning guideline
ERT	Electronic Reporting Tool
GACT	generally available control technology
HAP	hazardous air pollutant(s)
HCl	hydrochloric acid
HEM-4	Human Exposure Model, Version 1.5.5
HF	hydrogen fluoride
HI	hazard index
HQ	hazard quotient
ICR	Information Collection Request
IRIS	Integrated Risk Information System
km	kilometer
MACT	maximum achievable control technology
mg/kg-day	milligrams per kilogram per day
mg/m <sup>3</sup>	milligrams per cubic meter
MIR	maximum individual risk
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NEI	National Emissions Inventory
NESHAP	national emission standards for hazardous air pollutants
NTTAA	National Technology Transfer and Advancement Act
OAQPS	Office of Air Quality Planning and Standards
OMB	Office of Management and Budget
PB-HAP	hazardous air pollutants known to be persistent and bio-accumulative in the environment
PM	particulate matter
POM	polycyclic organic matter
ppm	parts per million
RBLC	Reasonably Available Control Technology, Best Available Control Technology, and Lowest Achievable Emission Rate Clearinghouse
RfC	reference concentration
RTR	residual risk and technology review

SAB	Science Advisory Board
SV	screening value
SSM	startup, shutdown, and malfunction
TOSHI	target organ-specific hazard index
tpy	tons per year
TRIM.FaTE	Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure model
UF	uncertainty factor
µg/m <sup>3</sup>	microgram per cubic meter
URE	unit risk estimate
USGS	U.S. Geological Survey
VCS	voluntary consensus standards

*Organization of this document.* The information in this preamble is organized as follows:

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- B. Paperwork Reduction Act (PRA)
- C. Regulatory Flexibility Act (RFA)

- D. Unfunded Mandates Reform Act (UMRA)
- E. Executive Order 13132: Federalism
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- G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks and 1 CFR Part 51
- H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use
- I. National Technology Transfer and Advancement Act (NTTAA)
- J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

## **I. General Information**

### *A. Does this action apply to me?*

The source categories that are the subject of this proposal are Primary Copper Smelting Major Sources regulated under 40 CFR part 63, subpart QQQ, and Primary Copper Smelting Area Sources, regulated under 40 CFR part 63, subpart EEEEEEE. The North American Industry Classification System (NAICS) code for the primary copper smelting industry is 331410. This list of categories and NAICS codes is not intended to be exhaustive, but rather provides a guide for readers regarding the entities that this proposed action is likely to affect. The proposed standards, once promulgated, will be directly applicable to the affected sources. State, local, and tribal governments would not be directly affected by this proposed action. As defined in the *Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990* (see 57 FR 31576, July 16, 1992) and *Documentation for Developing the Initial Source Category List, Final Report* (see EPA-450/3-91-030, July 1992), the Primary Copper Smelting major source category was defined as any major source facility engaged in the pyrometallurgical process used for the extraction of copper from sulfur oxides, native ore concentrates, or other copper bearing minerals. As originally defined, the category includes, but is not limited to, the following smelting process units: roasters, smelting furnaces, and converters. Affected sources under the current major source NESHAP are concentrate dryers, smelting furnaces, slag cleaning vessels, converters, and fugitive emission sources. The area source category was added to the source category list in 2002 (67 FR 70427, 70428). Affected sources under the area source

NESHAP are concentrate dryers, smelting vessels (e.g., furnaces), converting vessels, matte drying and grinding plants, secondary gas systems, and anode refining operations.

*B. Where can I get a copy of this document and other related information?*

In addition to being available in the docket, an electronic copy of this action is available on the Internet. Following signature by the EPA Administrator, the EPA will post a copy of this proposed action at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air> and at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-area-sources-national-emissions-standards>.

Following publication in the *Federal Register*, the EPA will post the *Federal Register* version of the proposal and key technical documents at these same websites. Information on the overall RTR program is available at <https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous>.

The proposed changes to the CFR that would be necessary to incorporate the changes proposed in this action are presented in attachments to the two memoranda titled: *Proposed Regulation Edits for 40 CFR Part 63, Subpart QQQ: Primary Copper Smelting NESHAP Risk and Technology Review Proposal*; and *Proposed Regulatory Edits for 40 CFR Part 63 Subpart EEEEE: Primary Copper Smelting Area Sources NESHAP Technology Review Proposal*, both of which are available in the docket for this action (Docket ID No. EPA-HQ-OAR-2020-0430). These documents include redline versions of the two regulations. Following signature by the EPA Administrator, the EPA will also post a copy of these two memoranda and the attachments to <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air> and to <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-area-sources-national-emissions-standards>.

## **II. Background**

*A. What is the statutory authority for this action?*

The statutory authority for this action is provided by sections 112 and 301 of the CAA, as amended (42 U.S.C. 7401 *et seq.*). Section 112 of the CAA establishes a two-stage regulatory process to develop standards for emissions of HAP from stationary sources. Generally, the first stage involves establishing technology-based standards and the second stage involves evaluating those standards that are based on maximum achievable control technology (MACT) to determine whether additional standards are needed to address any remaining risk associated with HAP emissions. This second stage is required under CAA section 112(f) and is commonly referred to as the “residual risk review.” In addition to the residual risk review, section 112(d)(6) of the CAA requires the EPA to review standards set under CAA section 112 every 8 years and revise the standards as necessary taking into account any “developments in practices, processes, or control technologies.” This review is commonly referred to as the “technology review.” When the two reviews are combined into a single rulemaking, it is commonly referred to as the “risk and technology review.” The discussion that follows identifies the most relevant statutory sections and briefly explains the contours of the methodology used to implement these statutory requirements. A more comprehensive discussion appears in the document titled *CAA Section 112 Risk and Technology Reviews: Statutory Authority and Methodology*, in the docket for this rulemaking.

In the first stage of the CAA section 112 standard setting process, the EPA promulgates technology-based standards under CAA section 112(d) for categories of sources identified as emitting one or more of the HAP listed in CAA section 112(b). Sources of HAP emissions are either major sources or area sources, and CAA section 112 establishes different requirements for major source standards and area source standards. “Major sources” are those that emit or have the potential to emit 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of any combination of HAP. All other sources are “area sources.” For major sources, CAA section 112(d)(2) provides that the technology-based NESHAP must reflect the maximum degree of emission reductions of HAP achievable (after considering cost, energy requirements, and non-air

quality health and environmental impacts). These standards are commonly referred to as MACT standards. CAA section 112(d)(3) also establishes a minimum control level for MACT standards, known as the MACT “floor.” In certain instances, as provided in CAA section 112(h), the EPA may set work practice standards in lieu of numerical emission standards. The EPA must also consider control options that are more stringent than the floor. Standards more stringent than the floor are commonly referred to as beyond-the-floor (BTF) standards. For area sources, CAA section 112(d)(5) gives the EPA discretion to set standards based on generally available control technologies or management practices (GACT standards) in lieu of MACT standards.

The second stage in standard-setting focuses on identifying and addressing any remaining (*i.e.*, “residual”) risk pursuant to CAA section 112(f). For source categories subject to MACT standards, section 112(f)(2) of the CAA requires the EPA to determine whether promulgation of additional standards is needed to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect. Section 112(d)(5) of the CAA provides that this residual risk review is not required for categories of area sources subject to GACT standards. Section 112(f)(2)(B) of the CAA further expressly preserves the EPA’s use of the two-step approach for developing standards to address any residual risk and the Agency’s interpretation of “ample margin of safety” developed in the National Emissions Standards for Hazardous Air Pollutants: Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants (Benzene NESHAP) (54 FR 38044, September 14, 1989). The EPA notified Congress in the Residual Risk Report that the Agency intended to use the Benzene NESHAP approach in making CAA section 112(f) residual risk determinations (EPA–453/R–99–001, p. ES–11). The EPA subsequently adopted this approach in its residual risk determinations and the United States Court of Appeals for the District of Columbia Circuit upheld the EPA’s interpretation that CAA section 112(f)(2) incorporates the approach established in the Benzene NESHAP. See *NRDC v. EPA*, 529 F.3d 1077, 1083 (D.C. Cir. 2008).

The approach incorporated into the CAA and used by the EPA to evaluate residual risk and to develop standards under CAA section 112(f)(2) is a two-step approach. In the first step, the EPA determines whether risks are acceptable. This determination “considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual lifetime [cancer] risk (MIR)<sup>1</sup> of approximately 1 in 10 thousand.” (54 FR at 38045). If risks are unacceptable, the EPA must determine the emissions standards necessary to reduce risk to an acceptable level without considering costs. In the second step of the approach, the EPA considers whether the emissions standards provide an ample margin of safety to protect public health “in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors, including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision.” *Id.* The EPA must promulgate emission standards necessary to provide an ample margin of safety to protect public health or determine that the standards being reviewed provide an ample margin of safety without any revisions. After conducting the ample margin of safety analysis, the Agency considers whether a more stringent standard is necessary to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

CAA section 112(d)(6) separately requires the EPA to review standards promulgated under CAA section 112 and revise them “as necessary (taking into account developments in practices, processes, and control technologies)” no less often than every 8 years. While conducting the technology review, the EPA is not required to recalculate the MACT floor. *Natural Resources Defense Council (NRDC) v. EPA*, 529 F.3d 1077, 1084 (D.C. Cir. 2008). *Association of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667 (D.C. Cir. 2013). The EPA may

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<sup>1</sup> Although defined as “maximum individual risk,” MIR refers only to cancer risk. MIR, one metric for assessing cancer risk, is the estimated risk if an individual were exposed to the maximum level of a pollutant for a lifetime.

consider cost in deciding whether to revise the standards pursuant to CAA section 112(d)(6). The EPA is required to address regulatory gaps, such as missing standards for listed air toxics known to be emitted from the source category. *Louisiana Environmental Action Network (LEAN) v. EPA*, 955 F.3d 1088 (D.C. Cir. 2020).

*B. What is this source category and how does the current NESHAP regulate its HAP emissions?*

The primary copper smelting source category includes any facility that uses a pyrometallurgical process to produce anode copper from copper ore concentrates. Primary copper smelting begins with copper mines supplying the ore concentrate (typically 30 percent copper). In most cases, the moisture is reduced from the ore concentrate in dryers, and then fed through a smelting furnace where it is melted and reacts to produce copper matte. One existing smelter is able to feed its copper concentrate directly to the smelting furnace without prior drying. Copper matte is a molten solution of copper sulfide mixed with iron sulfide and is about 60 percent copper. The solution is further refined using converters to make blister copper, which is approximately 98 percent copper. Converters use oxidation to remove sulfide as sulfur dioxide (SO<sub>2</sub>) gas and the iron as a ferrous oxide slag. The majority of the SO<sub>2</sub> gases are sent to a sulfuric acid plant. The slag is removed, cooled, and often processed again to remove any residual copper. The blister copper is reduced in the anode furnace to remove impurities and oxygen, typically by injecting natural gas and steam, to produce a high purity copper. The molten copper from the anode refining furnace is poured into molds and cooled to produce solid copper ingots called anodes. This process is known as casting. The anodes are sent to a copper refinery, either on-site or at an off-site location, for further purification using an electrolytic process to obtain high purity copper that is sold as a product.

The processing units of interest at primary copper smelters, because of their potential to generate HAP emissions, are the following: dryers, smelting furnaces, copper converters, anode refining furnaces, and, if present, copper holding vessels, slag cleaning vessels, and matte drying and grinding plants. In addition, fugitive emissions are sources of HAP at primary copper



smelters. The transfer of matte, converter slag, and blister copper is the primary source of fugitive emissions.

There are three primary copper smelting facilities in the U.S. that are subject to the NESHAPs in this review. Two of the facilities (Asarco and Freeport – both located in Arizona) are major sources of HAP emissions and are subject to subpart QQQ, the major source NESHAP; the third facility (Kennecott – located in Utah) is an area source and subject to subpart EEEEE, the area source NESHAP.

Two of the facilities (Asarco and Kennecott) use flash smelting furnaces (the INCO smelting furnace and the Outotec®, respectively). Flash smelting furnaces consist of blowing fine, dried copper sulfide concentrate and silica flux with air, oxygen-enriched air or oxygen into a hot hearth-type furnace. The sulfide minerals in the concentrate react with oxygen resulting in oxidation of the iron and sulfur, which produces heat and therefore melting of the solids. The molten matte and slag are removed separately from the furnace as they accumulate, and at the facility using the INCO furnace, the matte is transferred via ladles to the copper converters. The Freeport facility uses an ISA smelting furnace. The ISA smelt® process involves dropping wet feed through a feed port, such that dryers are not needed. A mixture of air, oxygen, and natural gas is blown through a vertical lance in the center of the furnace, generating heat and melting the feed. The molten metal is then tapped from the bottom and sent to an electric furnace to separate the matte from slag. The slag is removed from the electric furnace through tapholes and is transferred to slag pots via ladles. The matte is also removed from the electric furnace through tapholes and transferred to the converter via ladles.

At the area source primary copper smelter, molten copper matte tapped from the Outotec® smelting furnace is not transferred as molten material directly to the converting vessel as is performed at the two major source smelters. Instead, the matte is first quenched with water to form solid granules of copper matte. These matte granules are then ground to a finer texture and fed to the flash converting furnace for the continuous converting of copper. The continuous

copper converter differs significantly in design and operation from the cylindrical batch converters operated at the other U.S. smelters. Because there are no transfers of molten material between the smelting furnace and the continuous copper converter, this technology has inherently lower potential HAP emissions than a smelter using batch copper converting technology.

Molten blister copper is transferred from the converting vessel to an anode furnace for refining to further remove residual impurities and oxygen. The blister copper is reduced in the anode refining furnace to remove oxygen, typically by injecting natural gas and steam to produce a high purity copper. The molten copper from the anode refining furnace is poured into molds to produce solid copper ingots called anodes. The anode copper is sent to a copper refinery, either on-site or at another location, where it is further purified using an electrolytic process to obtain the high purity copper that is sold as a product. The copper refinery is not part of the primary copper smelting source category.

The current NESHAP for major sources (40 CFR part 63, subpart QQQ) was proposed on April 20, 1998 (63 FR 19582), with a supplement to the proposed rule published on June 26, 2000 (65 FR 39326). The final rule, promulgated on June 12, 2002 (67 FR 40478), established PM standards as a surrogate for HAP metals for copper concentrate dryers, smelting furnaces, slag cleaning vessels, and existing converters. The major source NESHAP applies to major sources that use batch copper converters. Regarding new sources, the NESHAP prohibits batch converters for new sources, which indirectly means that any new source would need to have continuous converters, similar to the area source (Kennebecott), or another technology. The converter building is subject to an opacity limit that only applies during performance testing. A fugitive dust plan is required to minimize fugitive dust emissions. Subpart QQQ also establishes requirements to demonstrate initial and continuous compliance with all applicable emission limitations, work practice standards, and operation and maintenance requirements. Annual performance testing is required to demonstrate compliance.

The NESHAP for area sources (40 CFR part 63, subpart EEEEEEE) establishes GACT standards for primary copper smelting area sources and was proposed on October 6, 2006 (71 FR 59302), and finalized on January 23, 2007 (72 FR 2930). Technical corrections were then published on July 3, 2007, via direct final rule (72 FR 36363). The affected sources (*i.e.*, copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plants, secondary gas systems and anode refining departments) are subject to PM limits as a surrogate for HAP metals. Compliance must be demonstrated by performance tests conducted every 2.5 years.

*C. What data collection activities were conducted to support this action?*

For the Primary Copper Smelting source category, the EPA used the best available data. Initially, emissions and supporting data from the 2017 National Emissions Inventory (NEI) were gathered to develop the initial draft model input file for the residual risk assessments for major source primary copper smelters. The NEI is a database that contains information about sources that emit criteria air pollutants, their precursors, and HAP. The database includes estimates of annual air pollutant emission from point, nonpoint, and mobile sources in the 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The EPA collects this information and releases an updated version of the NEI database every 3 years. The NEI includes data necessary for conducting risk modeling, including annual HAP emissions estimates from individual emission sources at facilities and the related emissions release parameters.

The Arizona Department of Environmental Quality (ADEQ) provided 2018 emissions test data for both major source primary copper smelters located in that state, which allowed the EPA to use more current metal HAP emissions data than what was available in the 2017 NEI in some cases. The data from ADEQ and the NEI were used to develop an initial draft risk model input file. This initial draft model file was posted to the EPA's Primary Copper website on February 26, 2020, and stakeholders were provided an opportunity to voluntarily review and provide input regarding the sources of emissions and release parameters that were reported in the

NEI. The Asarco and Freeport facilities provided input, and the modeling file was finalized. The data include multiple emissions test reports for PM and HAP metals for point source emissions from both facilities and seven test reports for emissions tests conducted in 2018, 2019 and 2020 for process fugitive emissions for anode refining, smelting furnaces and converters at Freeport. However, we have no test data for Asarco process fugitive emissions. The process fugitive emissions estimates for Asarco are based on emissions factors and process information. Therefore, we have higher confidence and less uncertainty with our emissions estimates for Freeport as compared to Asarco. We made an adjustment to the lead emissions estimates from the anode refining roofline at Freeport by applying a weighting factor to one of the 2018 test results. This factor is based on information in the document titled: *Technical Report on Test Method for Roofline Lead Emissions, Operational Influences During Testing, And Effect of Smelter Reconfiguration*, by Trinity Consultants, December 2018, which is available in the docket for this action. The data and data sources used to support this action and additional information on the development of the modeling file are described in Appendix 1 to the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*, which is available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430). Additional information is provided in section II.D below.

*D. What other relevant background information and data are available?*

The EPA used multiple sources of information to support this proposed action. Before developing the final list of affected facilities described in section II.B of this preamble, the EPA's Enforcement and Compliance History Online (ECHO) database was used as a tool to identify potentially affected facilities with primary copper smelting operations that are subject to the NESHAPs. The ECHO database provides integrated compliance and enforcement information for approximately 800,000 regulated facilities nationwide. The EPA also reviewed

the compliance history on the ADEQ website, active consent decrees, and consent orders to verify that the facilities were accurately classified as major sources.

During the technology review, the EPA examined information in the Reasonably Available Control Technology (RACT)/Best Available Control Technology (BACT)/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) to identify technologies in use and determine whether there have been relevant developments in practices, processes, or control technologies. The RBLC is a database that contains case specific information on air pollution technologies that have been required to reduce the emissions of air pollutants from stationary sources. Under the EPA's New Source Review (NSR) program, if a facility is planning new construction or a modification that will significantly increase air emissions, an NSR permit must be obtained. This central database promotes the sharing of information among permitting agencies and aids in case-by-case determinations for NSR permits. The EPA also reviewed subsequent air toxics regulatory actions for other source categories and information from a virtual site visit at the Freeport plant to determine whether there have been developments in practices, processes, or control technologies in the Primary Copper Smelting source category. The docket for this rulemaking contains the following document which provides more information on the technology review: *Final Technology Review for the Primary Copper Smelting Source Category*.

### **III. Analytical Procedures and Decision-Making**

In this section, the Agency describes the analyses performed to support the proposed decisions for the RTR and other issues addressed in this proposal. In this proposed action, pursuant to CAA section 112(f), the EPA conducted a risk review for the major sources in the primary copper smelting source category. Consistent with CAA section 112(f)(5), the risk review did not cover the area source category. Therefore, the discussions of risk assessment procedures described in the following paragraphs apply only to the major source category. However, pursuant to CAA section 112(d)(6), the EPA conducted a technology review for the NESHAPs

covering both the major source category and the area source category (40 CFR part 63, subpart EEEEE). Therefore, the following discussions of the technology reviews apply to both major sources and area sources.

*A. How do we consider risk in our decision-making?*

As discussed in section II.A of this preamble and in the Benzene NESHAP, in evaluating and developing standards under CAA section 112(f)(2), the Agency applies a two-step approach to determine whether or not risks are acceptable and to determine if the standards provide an ample margin of safety to protect public health. As explained in the Benzene NESHAP, “the first step judgment on acceptability cannot be reduced to any single factor” and, thus, “[t]he Administrator believes that the acceptability of risk under section 112 is best judged on the basis of a broad set of health risk measures and information.” (54 FR at 38046). Similarly, with regard to the ample margin of safety determination, “the Agency again considers all of the health risk and other health information considered in the first step. Beyond that information, additional factors relating to the appropriate level of control will also be considered, including cost and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors.” *Id.*

The Benzene NESHAP approach provides flexibility regarding factors the EPA may consider in making determinations and how the EPA may weigh those factors for each source category. The EPA conducts a risk assessment that provides estimates of the MIR posed by emissions of HAP that are carcinogens from each source in the source category, the hazard index (HI) for chronic exposures to HAP with the potential to cause noncancer health effects, and the hazard quotient (HQ) for acute exposures to HAP with the potential to cause noncancer health effects.<sup>2</sup> The assessment also provides estimates of the distribution of cancer risk within the

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<sup>2</sup> The MIR is defined as the cancer risk associated with a lifetime of exposure at the highest concentration of HAP where people are likely to live. The HQ is the ratio of the potential HAP exposure concentration to the noncancer dose-response value; the HI is the sum of HQs for HAP that affect the same target organ or organ system.

exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The scope of the EPA's risk analysis is consistent with the explanation in EPA's response to comments on our policy under the Benzene NESHAP:

The policy chosen by the Administrator permits consideration of multiple measures of health risk. Not only can the MIR figure be considered, but also incidence, the presence of noncancer health effects, and the uncertainties of the risk estimates. In this way, the effect on the most exposed individuals can be reviewed as well as the impact on the general public. These factors can then be weighed in each individual case. This approach complies with the *Vinyl Chloride* mandate that the Administrator ascertain an acceptable level of risk to the public by employing his expertise to assess available data. It also complies with the Congressional intent behind the CAA, which did not exclude the use of any particular measure of public health risk from the EPA's consideration with respect to CAA section 112 regulations, and thereby implicitly permits consideration of any and all measures of health risk which the Administrator, in his judgment, believes are appropriate to determining what will "protect the public health".

(54 FR at 38057). Thus, the level of the MIR is only one factor to be weighed in determining acceptability of risk. The Benzene NESHAP explained that "an MIR of approximately one in 10 thousand should ordinarily be the upper end of the range of acceptability. As risks increase above this benchmark, they become presumptively less acceptable under CAA section 112, and would be weighed with the other health risk measures and information in making an overall judgment on acceptability. Or, the Agency may find, in a particular case, that a risk that includes an MIR less than the presumptively acceptable level is unacceptable in the light of other health risk factors." *Id.* at 38045. In other words, risks that include an MIR above 100-in-1 million may be determined to be acceptable, and risks with an MIR below that level may be determined to be unacceptable, depending on all of the available health information. Similarly, with regard to the ample margin of safety analysis, the EPA stated in the Benzene NESHAP that: "EPA believes the relative weight of the many factors that can be considered in selecting an ample margin of safety can only be determined for each specific source category. This occurs mainly because technological and economic factors (along with the health-related factors) vary from source category to source category." *Id.* at 38061. The Agency also considers the uncertainties associated with the various risk analyses, as discussed earlier in this preamble, in our determinations of acceptability and ample margin of safety.

The EPA notes that it has not considered certain health information to date in making residual risk determinations. At this time, the Agency does not attempt to quantify the HAP risk that may be associated with emissions from other facilities that do not include the source category under review, mobile source emissions, natural source emissions, persistent environmental pollution, or atmospheric transformation in the vicinity of the sources in the category.

The EPA understands the potential importance of considering an individual's total exposure to HAP in addition to considering exposure to HAP emissions from the source category and facility. The Agency recognizes that such consideration may be particularly important when assessing noncancer risk, where pollutant-specific exposure health reference levels (*e.g.*, reference concentrations (RfCs)) are based on the assumption that thresholds exist for adverse health effects. For example, the EPA recognizes that, although exposures attributable to emissions from a source category or facility alone may not indicate the potential for increased risk of adverse noncancer health effects in a population, the exposures resulting from emissions from the facility in combination with emissions from all of the other sources (*e.g.*, other facilities) to which an individual is exposed may be sufficient to result in an increased risk of adverse noncancer health effects. In May 2010, the Science Advisory Board (SAB) advised the EPA "that RTR assessments will be most useful to decision makers and communities if results are presented in the broader context of aggregate and cumulative risks, including background concentrations and contributions from other sources in the area."<sup>3</sup>

In response to the SAB recommendations, the EPA incorporates cumulative risk analyses into its RTR risk assessments. The Agency (1) conducts facility-wide assessments, which include source category emission points, as well as other emission points within the facilities; (2)

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<sup>3</sup> Recommendations of the SAB Risk and Technology Review Methods Panel are provided in their report, which is available at: [https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/\\$File/EP-A-SAB-10-007-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EP-A-SAB-10-007-unsigned.pdf).



combines exposures from multiple sources in the same category that could affect the same individuals; and (3) for some persistent and bioaccumulative pollutants, analyzes the ingestion route of exposure. In addition, the RTR risk assessments consider aggregate cancer risk from all carcinogens and aggregated noncancer HQs for all noncarcinogens affecting the same target organ or target organ system.

Although the EPA is interested in placing source category and facility-wide HAP risk in the context of total HAP risk from all sources combined in the vicinity of each source, the EPA is also concerned about the uncertainties of doing so. Estimates of total HAP risk from emission sources other than those that the Agency has studied in depth during this RTR review would have significantly greater associated uncertainties than the source category or facility-wide estimates. Such aggregate or cumulative assessments would compound those uncertainties, making the assessments too unreliable.

*B. How do we perform the technology review?*

Our technology review primarily focuses on the identification and evaluation of developments in practices, processes, and control technologies that have occurred since the MACT standards were promulgated. Where we identify such developments, we analyze their technical feasibility, estimated costs, energy implications, and non-air environmental impacts. The EPA also considers the emission reductions associated with applying each development. This analysis informs our decision of whether it is “necessary” to revise the emissions standards. In addition, the Agency considers the appropriateness of applying controls to new sources versus retrofitting existing sources. For this exercise, the EPA considers any of the following to be a “development”:

- Any add-on control technology or other equipment that was not identified and considered during development of the original MACT standards;

- Any improvements in add-on control technology or other equipment (that were identified and considered during development of the original MACT standards) that could result in additional emissions reduction;
- Any work practice or operational procedure that was not identified or considered during development of the original MACT standards;
- Any process change or pollution prevention alternative that could be broadly applied to the industry and that was not identified or considered during development of the original MACT standards; and
- Any significant changes in the cost (including cost effectiveness) of applying controls (including controls the EPA considered during the development of the original MACT standards).

In addition to reviewing the practices, processes, and control technologies that were considered at the time the EPA originally developed the NESHAP, we review a variety of data sources in our investigation of potential practices, processes, or controls to consider. The EPA also reviews the NESHAP and the available data to determine if there are any unregulated emissions of HAP within the source category, and evaluate the data for use in developing new emission standards. See sections II.C and II.D of this preamble for information on the specific data sources that were reviewed as part of the technology review.

### *C. How do we estimate post-MACT risk posed by the source category?*

In this section, the EPA provides a complete description of the types of analyses that we generally perform during the risk assessment process. In some cases, the Agency does not perform a specific analysis because it is not relevant. For example, in the absence of emissions of hazardous air pollutants known to be persistent and bioaccumulative in the environment (PB-HAP), the Agency would not perform a multipathway exposure assessment. If an analysis is not performed, the Agency will provide the reason. While we present all of our risk assessment

methods, the Agency only presents risk assessment results for the analyses actually conducted (see section IV.B of this preamble).

The EPA conducts a risk assessment that provides estimates of the MIR for cancer posed by the HAP emissions from each source in the source category, the HI for chronic exposures to HAP with the potential to cause noncancer health effects, and the HQ for acute exposures to HAP with the potential to cause noncancer health effects. The assessment also provides estimates of the distribution of cancer risk within the exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The eight sections that follow this paragraph describe how the Agency estimated emissions and conducted the risk assessment. The docket for this rulemaking contains the following document which provides more information on the risk assessment inputs and models: *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*. The methods used to assess risk (as described in the eight primary steps below) are consistent with those described by the EPA in the document reviewed by a panel of the EPA's SAB in 2009<sup>4</sup> and described in the SAB review report issued in 2010. They are also consistent with the key recommendations contained in that report.

1. How did we estimate actual emissions and identify the emissions release characteristics?

To create the initial modeling input file, the Agency gathered actual HAP emissions data from the 2017 NEI and 2018 emissions estimates provided by ADEQ. The 2019 emissions data for Asarco and Freeport were not available when the initial modeling input file was developed. The Asarco plant's smelting operation was shut down for a significant portion of 2018 due to equipment upgrades. Since the 2019 emissions data for Asarco were not available, the 2017 NEI

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<sup>4</sup> U.S. EPA. *Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing*, June 2009. EPA-452/R-09-006. <https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous>.

data were used for the initial modeling input file. The Freeport plant made significant upgrades in 2017, so the 2018 emissions data were used for the initial modeling input file as the best representation of the current plant configuration. The modeling input file was posted on the EPA website on February 26, 2020, for public review. Asarco and Freeport provided comments, revisions to the initial modeling file, and supporting documents, which consisted of 2019 emissions data and various performance test reports. The data provided by both facilities were used to develop the final modeling input file.

For each NEI record, the EPA reviewed the standard classification code (SCC) and emission unit and process descriptions, and assigned the record to one of the emission process groups (*i.e.*, Anode Furnaces; Anode Refining Roofline; Combustion; Converters; Anode Furnaces and Converters; Converters Roofline; Dryers, Furnaces, Converters and Acid Plant; Non-process Fugitives; Rod Plant; Smelting Furnace Roofline; Smelting Furnace Secondary; Smelting Furnaces and Converters).

If the SCC and emission unit and process descriptions were ambiguous for a specific NEI record, the Agency used the facility air permits and flow diagrams to help us assign the appropriate emission process group. Both facilities have many combined gas streams that vent to a common control system and/or stack. In those cases, there may be multiple emissions sources included in the Emission Process Group Description. For example, at Asarco, the exhaust gases from the two dryers and flash furnace are vented to the same baghouse. The facility has a sampling port at the exhaust of the baghouse to measure emissions during performance testing. The emission sources associated with this example are represented by “Dryers and Flash Furnace” under the Emission Process Group Description.

The EPA did not conduct a risk review pursuant to section 112(f) of the CAA for Kennecott since it is an area source subject to GACT standards (not MACT standards). However, we did obtain emissions estimates and evaluated some information on ambient monitoring data near the facility.

Based on reported 2017 estimates to the NEI, Kennecott emits an estimated 5.6 tpy of lead and 1.6 tpy of arsenic. However, we do not have any HAP metals emissions test data for Kennecott. Therefore, we consider these estimates uncertain and we are soliciting comments, data and additional information regarding these emissions estimates.

With regard to ambient monitoring data, Utah Division of Air Quality (DAQ) conducted lead monitoring at the Magna station near the Kennecott copper smelter from January 2010 through June 2017 (see Figure 18 of the memorandum titled *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*). At that time Utah DAQ was able to demonstrate that the likelihood of violating the National Ambient Air Quality Standard (NAAQS) for lead was so low, it would no longer be necessary to run the monitor. With EPA's concurrence, the Magna lead monitor was shut down in June 2017. Utah DAQ and the EPA continue to evaluate the development of requirements, such as source emission thresholds, population, and NAAQS revisions, that may trigger the necessity to resume monitoring lead in Utah.<sup>5</sup> Nevertheless, the Agency solicits comments, data and additional information regarding these ambient monitoring data and how they should be considered in the context of the EPA's technology review of the Primary Copper Smelting area source NESHAP.

## 2. How did we estimate MACT-allowable emissions?

The available emissions data in the RTR emissions dataset include estimates of the mass of HAP emitted during a specified annual time period. These "actual" emission levels are often lower than the emission levels allowed under the requirements of the current MACT standards. The emissions allowed under the MACT standards are referred to as the "MACT-allowable" emissions. The Agency discussed the consideration of both MACT-allowable and actual emissions in the final Coke Oven Batteries RTR (70 FR 19992, 19998–19999, April 15, 2005) and in the proposed and final Hazardous Organic NESHAP RTR (71 FR 34421, 34428, June 14,

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<sup>5</sup> *Utah Division of Air Quality 2019 Annual Report*. 2019. Utah Department of Environmental Quality – Air Quality. Available at: <https://deq.utah.gov/air-quality/annual-reports-division-of-air-quality>.

2006, and 71 FR 76603, 76609, December 21, 2006, respectively). In those actions, the Agency noted that assessing the risk at the MACT-allowable level is inherently reasonable since that risk reflects the maximum level facilities could emit and still comply with national emission standards. The EPA also explained that it is reasonable to consider actual emissions, where such data are available, in both steps of the risk analysis, in accordance with the Benzene NESHAP approach. (54 FR 38044.)

The current Primary Copper Smelting NESHAP specifies numerical emission standards for each copper concentrate dryer, smelting vessel, and slag cleaning vessel. Consequently, the MACT-allowable emissions for each of these emission sources are assumed to be equal to the numerical emission standard. The NESHAP specifies work practice standards for fugitive dust sources. Therefore, the Agency believes that the actual fugitive dust sources emission levels are a reasonable estimation of the MACT-allowable emissions levels. The current NESHAP does not include standards for anode refining departments, anode refining rooflines, converter rooflines and smelting furnace rooflines. However, the EPA has determined that these sources are part of the source category and plans to propose MACT standards with this RTR. The MACT-allowable emissions for our baseline risk assessment for the anode refining departments, anode refining rooflines, converter rooflines and smelting furnace rooflines are assumed to be equal to the actual emissions, which are the estimated emissions prior to implementation of the proposed MACT standards.

For further details on the assumptions and methodologies used to estimate MACT-allowable emissions, see Appendix X of the document titled *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*, which is available in the docket for this rulemaking.

3. How do we conduct dispersion modeling, determine inhalation exposures, and estimate individual and population inhalation risk?

Both long-term and short-term inhalation exposure concentrations and health risk from the source category addressed in this proposal were estimated using the Human Exposure Model, Version 1.5.5 (HEM-4).<sup>6</sup> The HEM-4 performs three primary risk assessment activities: (1) conducting dispersion modeling to estimate the concentrations of HAP in ambient air, (2) estimating long-term and short-term inhalation exposures to individuals residing within 50 kilometers (km) of the modeled sources, and (3) estimating individual and population-level inhalation risk using the exposure estimates and quantitative dose-response information.

a. Dispersion Modeling

The air dispersion model AERMOD, used by the HEM-4 model, is one of the EPA's preferred models for assessing air pollutant concentrations from industrial facilities.<sup>7</sup> To perform the dispersion modeling and to develop the preliminary risk estimates, HEM-4 draws on three data libraries. The first is a library of meteorological data, which is used for dispersion calculations. This library includes 1 year (2016) of hourly surface and upper air observations from 840 meteorological stations. These stations may include multiple years other than meteorological data from 2016. These meteorological stations provide coverage of the United States and Puerto Rico. However, for this source category, the EPA utilized on-site meteorological data (2012-2013) from non-attainment modeling conducted by ADEQ. A second library of United States Census Bureau census block<sup>8</sup> internal point locations and populations provides the basis of human exposure calculations (U.S. Census, 2010). In addition, for each census block, the census library includes the elevation and controlling hill height, which are also used in dispersion calculations. A third library of pollutant-specific dose-response values is used to estimate health risk. These are discussed below.

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<sup>6</sup> For more information about HEM-4, go to <https://www.epa.gov/fera/risk-assessment-and-modeling-human-exposure-model-hem>.

<sup>7</sup> U.S. EPA. Revision to the *Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions* (70 FR 68218, November 9, 2005).

<sup>8</sup> A census block is the smallest geographic area for which census statistics are tabulated.

## b. Risk from Chronic Exposure to HAP

In developing the risk assessment for chronic exposures, the EPA uses the estimated annual average ambient air concentrations of each HAP emitted by each source in the source category. The HAP air concentrations at each nearby census block centroid located within 50 km of the facility are a surrogate for the chronic inhalation exposure concentration for all the people who reside in that census block. A distance of 50 km is consistent with both the analysis supporting the 1989 Benzene NESHAP (54 FR 38044) and the limitations of Gaussian dispersion models, including AERMOD.

For each facility, the Agency calculates the MIR as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, 52 weeks per year, 70 years) exposure to the maximum concentration at the centroid of each inhabited census block. The EPA calculates individual cancer risk by multiplying the estimated lifetime exposure to the ambient concentration of each HAP (in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )) by its unit risk estimate (URE). The URE is an upper-bound estimate of an individual's incremental risk of contracting cancer over a lifetime of exposure to a concentration of 1 microgram of the pollutant per cubic meter of air. For residual risk assessments, the EPA generally uses UREs from the EPA's Integrated Risk Information System (IRIS). For carcinogenic pollutants without IRIS values, the EPA looks to other reputable sources of cancer dose-response values, often using California EPA (CalEPA) UREs, where available. In cases where new, scientifically credible dose-response values have been developed in a manner consistent with the EPA's guidelines and have undergone a similar peer review process, the Agency may use such dose-response values in place of, or in addition to, other values, if appropriate. The pollutant-specific dose-response values used to estimate health risk are available at <https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants>.



Arsenic emissions from this source category are driving cancer risks. Inhalation cancer risks are based on an association between cumulative arsenic exposure and an increase in lung cancer mortality in two distinct smelter worker populations.<sup>9</sup>

Arsenic is also evaluated for multipathway risks as a PB-HAP based upon conservative food ingestions rates (*i.e.*, ingestion of fish and produce) and ingestion of contaminated soil.

To estimate individual lifetime cancer risks associated with exposure to HAP emissions from each facility in the source category, the Agency sums the risks for each of the carcinogenic HAP<sup>10</sup> emitted by the modeled facility. We estimate cancer risk at every census block within 50 km of every facility in the source category. The MIR is the highest individual lifetime cancer risk estimated for any of those census blocks. In addition to calculating the MIR, we estimate the distribution of individual cancer risks for the source category by summing the number of individuals within 50 km of the sources whose estimated risk falls within a specified risk range. We also estimate annual cancer incidence by multiplying the estimated lifetime cancer risk at each census block by the number of people residing in that block, summing results for all of the census blocks, and then dividing this result by a 70-year lifetime.

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<sup>9</sup> US EPA IRIS; *Chemical Assessment Summary for Arsenic (inorganic)*  
[https://cfpub.epa.gov/ncea/iris/iris\\_documents/documents/subst/0278\\_summary.pdf#nameddest=cancerinhal](https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0278_summary.pdf#nameddest=cancerinhal).

<sup>10</sup> The EPA's 2005 *Guidelines for Carcinogen Risk Assessment* classifies carcinogens as: "carcinogenic to humans," "likely to be carcinogenic to humans," and "suggestive evidence of carcinogenic potential." These classifications also coincide with the terms "known carcinogen, probable carcinogen, and possible carcinogen," respectively, which are the terms advocated in the EPA's *Guidelines for Carcinogen Risk Assessment*, published in 1986 (51 FR 33992, September 24, 1986). In August 2000, the document, *Supplemental Guidance for Conducting Health Risk Assessment of Chemical Mixtures* (EPA/630/R-00/002), was published as a supplement to the 1986 document. Copies of both documents can be obtained from <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=20533&CFID=70315376&CFTOKEN=71597944>. Summing the risk of these individual compounds to obtain the cumulative cancer risk is an approach that was recommended by the EPA's SAB in their 2002 peer review of the EPA's National Air Toxics Assessment (NATA) titled *NATA - Evaluating the National-scale Air Toxics Assessment 1996 Data -- an SAB Advisory*, available at [https://yosemite.epa.gov/sab/sabproduct.nsf/214C6E915BB04E14852570CA007A682C/\\$File/ecadv02001.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/214C6E915BB04E14852570CA007A682C/$File/ecadv02001.pdf).

To assess the risk of noncancer health effects from chronic exposure to HAP, we calculate either an HQ or a target organ-specific hazard index (TOSHI). We calculate an HQ when a single noncancer HAP is emitted. Where more than one noncancer HAP is emitted, we sum the HQ for each of the HAP that affects a common target organ or target organ system to obtain a TOSHI. The HQ is the estimated exposure divided by the chronic noncancer dose-response value, which is a value selected from one of several sources. The preferred chronic noncancer dose-response value is the EPA RfC, defined as “an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime”

([https://iaspub.epa.gov/sor\\_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary](https://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary)). In cases where an RfC from the EPA’s IRIS is not available or where the EPA determines that using a value other than the RfC is appropriate, sometimes the EPA uses such an alternative value to assess risks. An example of such an alternative value is the use of the primary NAAQS for lead. The lead NAAQS is based upon a maximum 3-month average ambient concentration of 0.15 ug/m<sup>3</sup>. Additional chronic noncancer dose-response values can be a value from the following prioritized sources, which define their dose-response values similarly to the EPA: (1) the Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Level (<https://www.atsdr.cdc.gov/mrls/index.asp>); (2) the CalEPA Chronic Reference Exposure Level (<https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>); or (3) as noted above, a scientifically credible dose-response value that has been developed in a manner consistent with the EPA guidelines and has undergone a peer review process similar to that used by the EPA. The pollutant-specific dose-response values used to estimate health risks are available at <https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants>.

This assessment identified emissions of arsenic and lead as a chronic noncancer hazard concern for children. Both pollutants impact brain development. The chronic, noncancer health effect benchmark for arsenic exposure is based on a decrease in intellectual function and adverse effects on neurobehavioral development in 10-yr-old children exposed through drinking water from birth.<sup>11</sup>

For lead, the NAAQS of 0.15 µg/m<sup>3</sup> specifies a level of air quality that protects the most sensitive subpopulation, children, from adverse effects, such as IQ loss, with an adequate margin of safety following exposure through inhalation or ingestion of lead previously emitted into the air.<sup>12</sup> Several studies were used as the basis for the standard, including an international pooled analysis of seven prospective cohort studies (n = 1,333).<sup>13</sup>

A review of the health effect benchmarks for arsenic and lead determined that, although the target organ is the same for these two pollutants, a TOSHI should not be calculated based upon the difference in exposure duration for the two benchmarks. The chronic REL for arsenic is an airborne concentration of inorganic arsenic at or below which no adverse noncancer health effects are anticipated in individuals indefinitely exposed to that concentration, while the lead standard is applied to a maximum 3-month rolling average of monitored lead concentrations.

#### c. Risk from Acute Exposure to HAP that May Cause Health Effects Other Than Cancer

For each HAP for which appropriate acute inhalation dose-response values are available, the EPA also assesses the potential health risks due to acute exposure. For these assessments, the EPA makes conservative assumptions about emission rates, meteorology, and exposure location. As part of our efforts to continually improve our methodologies to evaluate the risks that HAP emitted from categories of industrial sources pose to human health and the environment,<sup>14</sup> the

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<sup>11</sup> Wasserman et al. (2004) and Tsai et al. (2003).

<sup>12</sup> *EPA Final Rule (National Ambient Air Quality Standards for Lead*; November 12, 2008); <https://www.govinfo.gov/content/pkg/FR-2008-11-12/pdf/E8-25654.pdf>.

<sup>13</sup> Lanphear et al. (2005).

<sup>14</sup> See, e.g., U.S. EPA. *Screening Methodologies to Support Risk and Technology Reviews (RTR): A Case Study Analysis* (Draft Report, May 2017. <https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous>).

EPA revised our treatment of meteorological data to use reasonable worst-case air dispersion conditions in our acute risk screening assessments instead of worst-case air dispersion conditions. This revised treatment of meteorological data and the supporting rationale are described in more detail in *Residual Risk Assessment for Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report: *Technical Support Document for Acute Risk Screening Assessment*. This revised approach has been used in this proposed rule and in all other RTR rulemakings proposed on or after June 3, 2019.

To assess the potential acute risk to the maximally exposed individual, we use the peak hourly emission rate for each emission point,<sup>15</sup> reasonable worst-case air dispersion conditions (*i.e.*, 99<sup>th</sup> percentile), and the point of highest off-site exposure. Specifically, we assume that peak emissions from the source category and reasonable worst-case air dispersion conditions co-occur and that a person is present at the point of maximum exposure.

To characterize the potential health risks associated with estimated acute inhalation exposures to a HAP, we generally use multiple acute dose-response values, including acute RELs, acute exposure guideline levels (AEGLs), and emergency response planning guidelines (ERPG) for 1-hour exposure durations, if available, to calculate acute HQs. The acute HQ is calculated by dividing the estimated acute exposure concentration by the acute dose-response value. For each HAP for which acute dose-response values are available, the EPA calculates acute HQs. For this source category, acute risks from arsenic were a concern based upon the 1-

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<sup>15</sup> In the absence of hourly emission data, the EPA develops estimates of maximum hourly emission rates by multiplying the average actual annual emissions rates by a factor (either a category-specific factor or a default factor of 10) to account for variability. This is documented in *Residual Risk Assessment for Primary Copper Smelting Major Source Category in Support of the 2020 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report: *Technical Support Document for Acute Risk Screening Assessment*. Both are available in the docket for this rulemaking.

hour REL of 0.2 µg/m<sup>3</sup>. The acute REL is based on developmental effects in mice (decreased fetal weight, growth retardation, skeletal defects)<sup>16</sup>.

An acute REL is defined as “the concentration level at or below which no adverse health effects are anticipated for a specified exposure duration.”<sup>17</sup> Acute RELs are based on the most sensitive, relevant, adverse health effect reported in the peer-reviewed medical and toxicological literature. They are designed to protect the most sensitive individuals in the population through the inclusion of margins of safety. Because margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact. AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours.<sup>18</sup> They are guideline levels for “once-in-a-lifetime, short-term exposures to airborne concentrations of acutely toxic, high-priority chemicals.” *Id.* at 21. The AEGL–1 is specifically defined as “the airborne concentration (expressed as ppm (parts per million) or mg/m<sup>3</sup> (milligrams per cubic meter)) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.” *Id.* at 3. The document also notes that “Airborne concentrations below AEGL–1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor,

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<sup>16</sup> Nagymajtenyi et al. 1985.

<sup>17</sup> CalEPA issues acute RELs as part of its Air Toxics Hot Spots Program, and the 1-hour and 8-hour values are documented in *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I, The Determination of Acute Reference Exposure Levels for Airborne Toxicants*, which is available at <https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary>.

<sup>18</sup> National Academy of Sciences, 2001. *Standing Operating Procedures for Developing Acute Exposure Levels for Hazardous Chemicals*, page 2. Available at [https://www.epa.gov/sites/production/files/2015-09/documents/sop\\_final\\_standing\\_operating\\_procedures\\_2001.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/sop_final_standing_operating_procedures_2001.pdf). Note that the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances ended in October 2011, but the AEGL program continues to operate at the EPA and works with the National Academies to publish final AEGLs (<https://www.epa.gov/aegl>).

taste, and sensory irritation or certain asymptomatic, nonsensory effects.” *Id.* AEGL–2 are defined as “the airborne concentration (expressed as parts per million or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.” *Id.*

ERPGs are “developed for emergency planning and are intended as health-based guideline concentrations for single exposures to chemicals.”<sup>19</sup> *Id.* at 1. The ERPG–1 is defined as “the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or without perceiving a clearly defined, objectionable odor.” *Id.* at 2. Similarly, the ERPG–2 is defined as “the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual’s ability to take protective action.” *Id.* at 1.

An acute REL for 1-hour exposure durations is typically lower than its corresponding AEGL–1 and ERPG–1. Even though their definitions are slightly different, AEGL–1s are often the same as the corresponding ERPG–1s, and AEGL–2s are often equal to ERPG–2s. The maximum HQs from our acute inhalation screening risk assessment typically result when we use the acute REL for a HAP. In cases where the maximum acute HQ exceeds 1, we also report the HQ based on the next highest acute dose-response value (usually the AEGL–1 and/or the ERPG–1).

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<sup>19</sup> *ERPGS Procedures and Responsibilities*. March 2014. American Industrial Hygiene Association. Available at: <https://www.aiha.org/get-involved/AIHAGuidelineFoundation/EmergencyResponsePlanningGuidelines/Documents/ERPG%20Committee%20Standard%20Operating%20Procedures%20%20-%20March%202014%20Revision%20%28Updated%2010-2-2014%29.pdf>.

For this source category, we developed source category-specific acute factors ranging from 3 to 10 to estimate peak hourly emissions from annual emissions estimates for the input to the acute risk assessment modeling analysis. In general, hourly emissions estimates were based on batch cycle times for smelting and anode furnaces with an emission hourly multiplier of 3 applied while road fugitive emissions were modeled with a default hourly multiplier of 10 times the annual average. A further discussion of these factors and why they were chosen can be found in the memorandum, *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*, available in the docket for this rulemaking.

In our acute inhalation screening risk assessment, acute impacts are deemed negligible for HAP for which acute HQs are less than or equal to 1, and no further analysis is performed for these HAP. In cases where an acute HQ from the screening step is greater than 1, we assess the site-specific data to ensure that the acute HQ is at an off-site location. For this source category, the data refinements employed consisted of overlaying satellite imagery with off-site polar receptors to estimate off-site acute impacts. These refinements are discussed more fully in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*, which is available in the docket for this source category.

#### 4. How do we conduct the multipathway exposure and risk screening assessment?

The EPA conducts a tiered screening assessment examining the potential for significant human health risks due to exposures via routes other than inhalation (*i.e.*, ingestion). We first determine whether any sources in the source category emit any HAP known to be persistent and bioaccumulative in the environment, as identified in the EPA's Air Toxics Risk Assessment Library (see Volume 1, Appendix D, at <https://www.epa.gov/fera/risk-assessment-and-modeling-air-toxics-risk-assessment-reference-library>).

For the Primary Copper Smelting source category, we identified PB-HAP emissions of lead, arsenic, mercury and cadmium, so we proceeded to the next step of the evaluation. Except

for lead, the human health risk screening assessment for PB-HAP consists of three progressive tiers. In a Tier 1 screening assessment, we determine whether the magnitude of the facility-specific emissions of PB-HAP warrants further evaluation to characterize human health risk through upper-end ingestion rates of (meat, produce, fruits, fish, etc.) based upon a combined farmer and fisher scenario. To facilitate this step, we evaluate emissions against previously developed screening threshold emission rates for several PB-HAP that are based on a hypothetical upper-end screening exposure scenario developed for use in conjunction with the EPA's Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure (TRIM.FaTE) model. The PB-HAP with screening threshold emission rates are arsenic compounds, cadmium compounds, chlorinated dibenzodioxins and furans, mercury compounds, and polycyclic organic matter (POM). Based on the EPA estimates of toxicity and bioaccumulation potential, these pollutants represent a conservative list for inclusion in multipathway risk assessments for RTR rules. (For more details see the risk assessment report cited above and Volume 1, Appendix D at [https://www.epa.gov/sites/production/files/2013-08/documents/volume\\_1\\_reflibrary.pdf](https://www.epa.gov/sites/production/files/2013-08/documents/volume_1_reflibrary.pdf)). In this assessment, we compare the facility-specific emission rates of these PB-HAP to the screening threshold emission rates for each PB-HAP to assess the potential for significant human health risks via the ingestion pathway. We call this application of the TRIM.FaTE model the Tier 1 screening assessment. The ratio of a facility's actual emission rate to the Tier 1 screening threshold emission rate is a screening value (SV).

We derive the Tier 1 screening threshold emission rates for these PB-HAP (other than lead compounds) to correspond to a maximum excess lifetime cancer risk of 1-in-1 million (*i.e.*, for arsenic compounds, polychlorinated dibenzodioxins and furans, and POM) or, for HAP that cause noncancer health effects (*i.e.*, cadmium compounds and mercury compounds), a maximum HQ of 1. If the emission rate of any one PB-HAP or combination of carcinogenic PB-HAP in the Tier 1 screening assessment exceeds the Tier 1 screening threshold emission rate for any facility (*i.e.*, the SV is greater than 1), we conduct a second screening assessment, which we call the Tier



2 screening assessment. The Tier 2 screening assessment separates the Tier 1 combined fisher and farmer exposure scenario into fisher, farmer, and gardener scenarios that retain upper-bound ingestion rates.

In the Tier 2 screening assessment, the location of each facility that exceeds a Tier 1 screening threshold emission rate is used to refine the assumptions associated with the Tier 1 fisher and farmer exposure scenarios at that facility. A key assumption in the Tier 1 screening assessment is that a lake and/or farm is located near the facility. As part of the Tier 2 screening assessment, we use a U.S. Geological Survey (USGS) database to identify actual waterbodies within 50 km of each facility and assume the fisher only consumes fish from lakes within that 50 km zone. We also examine the differences between local meteorology near the facility and the meteorology used in the Tier 1 screening assessment. We then adjust the previously developed Tier 1 screening threshold emission rates for each PB-HAP for each facility based on an understanding of how exposure concentrations estimated for the screening scenario change with the use of local meteorology and the USGS lakes database.

In the Tier 2 farmer scenario, we maintain an assumption that the farm is located within 0.5 km of the facility and that the farmer consumes meat, eggs, dairy, vegetables, and fruit produced near the facility. We may further refine the Tier 2 screening analysis by assessing a gardener scenario to characterize a range of exposures, with the gardener scenario being more plausible in RTR evaluations. Under the gardener scenario, we assume the gardener consumes home-produced eggs, vegetables, and fruit products at the same ingestion rate as the farmer. The Tier 2 screen continues to rely on the high-end food intake assumptions that were applied in Tier 1 for local fish (adult female angler at 99<sup>th</sup> percentile fish consumption<sup>20</sup>) and locally grown or raised foods (90<sup>th</sup> percentile consumption of locally grown or raised foods for the farmer and

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<sup>20</sup> Burger, J. 2002. *Daily consumption of wild fish and game: Exposures of high end recreationists. International Journal of Environmental Health Research*, 12:343–354.

gardener scenarios<sup>21</sup>). If PB-HAP emission rates do not result in a Tier 2 SV greater than 1, we consider those PB-HAP emissions to pose risks below a level of concern. If the PB-HAP emission rates for a facility exceed the Tier 2 screening threshold emission rates, we may conduct a Tier 3 screening assessment.

There are several analyses that can be included in a Tier 3 screening assessment, depending upon the extent of refinement warranted, including validating that the lakes are fishable, locating residential/garden locations for urban and/or rural settings, considering plume-rise to estimate emissions lost above the mixing layer, and considering hourly effects of meteorology and plume-rise on chemical fate and transport (a time-series analysis). If necessary, the EPA may further refine the screening assessment through a site-specific assessment.

In evaluating the potential multipathway risk from emissions of lead compounds, rather than developing a screening threshold emission rate, the Agency compares maximum estimated chronic inhalation exposure concentrations to the level of the current NAAQS for lead.<sup>22</sup> Values below the level of the primary (health-based) lead NAAQS are considered to have a low potential for multipathway risk. For this source category based upon high modeled annual concentrations of lead from HEM-4, a refined assessment was conducted to estimate the maximum 3-month average concentration for lead over multiple years. These refinements included the use of a post-processor (Lead-POST) in AERMOD to calculate the maximum 3-

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<sup>21</sup> U.S. EPA. *Exposure Factors Handbook 2011 Edition (Final)*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/052F, 2011.

<sup>22</sup> In doing so, the EPA notes that the legal standard for a primary NAAQS – that a standard is requisite to protect public health and provide an adequate margin of safety (CAA section 109(b)) – differs from the CAA section 112(f) standard (requiring, among other things, that the standard provide an “ample margin of safety to protect public health”). However, the primary lead NAAQS is a reasonable measure of determining risk acceptability (*i.e.*, the first step of the Benzene NESHAP analysis) since it is designed to protect the most susceptible group in the human population – children, including children living near major lead emitting sources. 73 FR 67002/3; 73 FR 67000/3; 73 FR 67005/1. In addition, applying the level of the primary lead NAAQS at the risk acceptability step is conservative since that primary lead NAAQS reflects an adequate margin of safety.

month lead concentration for each off-site receptor to directly compare to the current lead NAAQS standard.<sup>23</sup>

For further information on the multipathway assessment approach, see the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, which is available in the docket for this action.

5. How do we assess risks considering emissions control options?

In addition to assessing baseline inhalation risks and screening for potential multipathway risks, the EPA also estimates risks considering the potential emission reductions that would be achieved by the control options under consideration. In these cases, the expected emission reductions are applied to the specific HAP and emission points in the RTR emissions dataset to develop corresponding estimates of risk and incremental risk reductions.

6. How do we conduct the environmental risk screening assessment?

a. Adverse Environmental Effect, Environmental HAP, and Ecological Benchmarks

The EPA conducts a screening assessment to examine the potential for an adverse environmental effect as required under section 112(f)(2)(A) of the CAA. Section 112(a)(7) of the CAA defines “adverse environmental effect” as “any significant and widespread adverse effect, which may reasonably be anticipated, to wildlife, aquatic life, or other natural resources, including adverse impacts on populations of endangered or threatened species or significant degradation of environmental quality over broad areas.”

The EPA focuses on eight HAP, which are referred to as “environmental HAP,” in its screening assessment: six PB-HAP and two acid gases. The PB-HAP included in the screening assessment are arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. The acid gases included in the screening assessment are hydrochloric acid (HCl) and hydrogen fluoride (HF).

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<sup>23</sup> EPA Support Center for Regulatory Atmospheric Modeling site to access LEADPOST utilized in the Pb NAAQS program: <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>.

HAP that persist and bioaccumulate are of particular environmental concern because they accumulate in the soil, sediment, and water. The acid gases, HCl and HF, are included due to their well-documented potential to cause direct damage to terrestrial plants. In the environmental risk screening assessment, the EPA evaluates the following four exposure media: terrestrial soils, surface water bodies (includes water-column and benthic sediments), fish consumed by wildlife, and air. Within these four exposure media, the Agency evaluates nine ecological assessment endpoints, which are defined by the ecological entity and its attributes. For PB-HAP (other than lead), both community-level and population-level endpoints are included. For acid gases, the ecological assessment endpoint evaluated is terrestrial plant communities.

An ecological benchmark represents a concentration of HAP that has been linked to a particular environmental effect level. For each environmental HAP, the Agency identified the available ecological benchmarks for each assessment endpoint and where possible, the ecological benchmarks at the following effect levels: probable effect levels, lowest-observed-adverse-effect level, and no-observed-adverse-effect level. In cases where multiple effect levels were available for a particular PB-HAP and assessment endpoint, the EPA uses all of the available effect levels to help us to determine whether ecological risks exist and, if so, whether the risks could be considered significant and widespread.

For further information on how the environmental risk screening assessment was conducted, including a discussion of the risk metrics used, how the environmental HAP were identified, and how the ecological benchmarks were selected, see Appendix 9 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, which is available in the docket for this action.

b. Environmental Risk Screening Methodology

For the environmental risk screening assessment, the EPA first determined whether any facilities in the Primary Copper Smelting source category emitted any of the environmental HAP. For the Primary Copper Smelting source category, the Agency identified emissions of

arsenic, mercury, cadmium and lead. Because one or more of the environmental HAP evaluated are emitted by at least one facility in the source category, the Agency proceeded to the second step of the evaluation.

#### c. PB-HAP Methodology for Environmental Risk Screening

The environmental risk screening assessment includes six PB-HAP: arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. With the exception of lead, the environmental risk screening assessment for PB-HAP consists of three tiers. The first tier of the environmental risk screening assessment uses the same health-protective conceptual model that is used for the Tier 1 human health screening assessment. TRIM.FaTE model simulations were used to back-calculate Tier 1 screening threshold emission rates. The screening threshold emission rates represent the emission rate in tons of pollutant per year that results in media concentrations at the facility that equal the relevant ecological benchmark. To assess emissions from each facility in the category, the reported emission rate for each PB-HAP was compared to the Tier 1 screening threshold emission rate for that PB-HAP for each assessment endpoint and effect level. If emissions from a facility do not exceed the Tier 1 screening threshold emission rate, the facility “passes” the screening assessment, and, therefore, is not evaluated further under the screening approach. If emissions from a facility exceed the Tier 1 screening threshold emission rate, the EPA evaluates the facility further in Tier 2.

In Tier 2 of the environmental risk screening assessment, the screening threshold emission rates are adjusted to account for local meteorology and the actual location of lakes in the vicinity of facilities that did not pass the Tier 1 screening assessment. For soils, the EPA evaluates the average soil concentration for all soil parcels within a 7.5-km radius for each facility and PB-HAP. For the water, sediment, and fish tissue concentrations, the highest value for each facility for each pollutant is used. If emission concentrations from a facility do not exceed the Tier 2 screening threshold emission rate, the facility “passes” the screening

assessment and typically is not evaluated further. If emissions from a facility exceed the Tier 2 screening threshold emission rate, the EPA evaluates the facility further in Tier 3.

As in the multipathway human health risk assessment, in Tier 3 of the environmental risk screening assessment, the Agency examines the suitability of the lakes around the facilities to support life and remove those that are not suitable (*e.g.*, lakes that have been filled in or are industrial ponds), adjust emissions for plume-rise, and conduct hour-by-hour time-series assessments. If these Tier 3 adjustments to the screening threshold emission rates still indicate the potential for an adverse environmental effect (*i.e.*, facility emission rate exceeds the screening threshold emission rate), the Agency may elect to conduct a more refined assessment using more site-specific information. If, after additional refinement, the facility emission rate still exceeds the screening threshold emission rate, the facility may have the potential to cause an adverse environmental effect.

To evaluate the potential for an adverse environmental effect from lead, we compared the average modeled air concentrations (from HEM-4) of lead around each facility in the source category to the level of the secondary NAAQS for lead. The secondary lead NAAQS is a reasonable means of evaluating environmental risk because it is set to provide substantial protection against adverse welfare effects which can include “effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.”

d. Acid Gas Environmental Risk Methodology

The environmental risk screening assessment for acid gases evaluates the potential phytotoxicity and reduced productivity of plants due to chronic exposure to HF and HCl. The environmental risk screening methodology for acid gases is a single-tier screening assessment that compares modeled ambient air concentrations (from AERMOD) to the ecological benchmarks for each acid gas. To identify a potential adverse environmental effect (as defined in

section 112(a)(7) of the CAA) from emissions of HF and HCl, the Agency evaluates the following metrics: the size of the modeled area around each facility that exceeds the ecological benchmark for each acid gas, in acres and square kilometers; the percentage of the modeled area around each facility that exceeds the ecological benchmark for each acid gas; and the area-weighted average SV around each facility (calculated by dividing the area-weighted average concentration over the 50-km modeling domain by the ecological benchmark for each acid gas). For further information on the environmental screening assessment approach, see Appendix 9 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 20201 Proposed Rule*, which is available in the docket for this action.

#### 7. How do we conduct facility-wide assessments?

To put the source category risks in context, the EPA typically examines the risks from the entire “facility,” where the facility includes all HAP-emitting operations within a contiguous area and under common control. In other words, the Agency examines the HAP emissions not only from the source category emission points of interest, but also emissions of HAP from all other emission sources at the facility for which we have data. For this source category, we conducted the facility-wide assessment using a dataset compiled from the 2017 NEI and 2018 actual emissions provided by ADEQ. The source category records of that 2017 and 2018 actual emissions dataset were removed, evaluated, and updated as described in section II.C of this preamble: What data collection activities were conducted to support this action? Once a quality assured source category dataset was available, it was placed back with the remaining records from the NEI for that facility. The facility-wide file was then used to analyze risks due to the inhalation of HAP that are emitted “facility-wide” for the populations residing within 50 km of each facility, consistent with the methods used for the source category analysis described above. For these facility-wide risk analyses, the modeled source category risks were compared to the facility-wide risks to determine the portion of the facility-wide risks that could be attributed to

the source category addressed in this proposal. The EPA also specifically examined the facility that was associated with the highest estimate of risk and determined the percentage of that risk attributable to the source category of interest. The *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 20201 Proposed Rule*, available through the docket for this action, provides the methodology and results of the facility-wide analyses, including all facility-wide risks and the percentage of source category contribution to facility-wide risks.

#### 8. How do we consider uncertainties in risk assessment?

Uncertainty and the potential for bias are inherent in all risk assessments, including those performed for this proposal. Although uncertainty exists, we believe that our approach, which used conservative tools and assumptions, ensures that our decisions are health and environmentally protective. A brief discussion of the uncertainties in the RTR emissions dataset, dispersion modeling, inhalation exposure estimates, and dose-response relationships follows below. Also included are those uncertainties specific to our acute screening assessments, multipathway screening assessments, and our environmental risk screening assessments. A more thorough discussion of these uncertainties is included in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, which is available in the docket for this action. If a multipathway site-specific assessment was performed for this source category, a full discussion of the uncertainties associated with that assessment can be found in Appendix 11 of that document, *Site-Specific Human Health Multipathway Residual Risk Assessment Report*.

##### a. Uncertainties in the RTR Emissions Dataset

Although the development of the RTR emissions dataset involved quality assurance/quality control processes, the accuracy of emissions values will vary depending on the source of the data, the degree to which data are incomplete or missing, the degree to which assumptions made to complete the datasets are accurate, errors in emission estimates, and other



factors. The emission estimates considered in this analysis generally are annual totals for certain years, and they generally do not reflect short-term fluctuations during the course of a year or variations from year to year except in potentially a few cases, such as the May/June 2018 lead test data for anode refining roof vent fugitive emissions from the Freeport facility. Nevertheless, the estimates of peak hourly emission rates for the acute effects screening assessment were based on emission adjustment factors applied to the average annual hourly emission rates, which are intended to account for emission fluctuations due to normal facility operations.

#### b. Uncertainties in Dispersion Modeling

The EPA recognizes there is uncertainty in ambient concentration estimates associated with any model, including the EPA's recommended regulatory dispersion model, AERMOD. In using a model to estimate ambient pollutant concentrations, the user chooses certain options to apply. For RTR assessments, we select some model options that have the potential to overestimate ambient air concentrations (*e.g.*, not including plume depletion or pollutant transformation). We select other model options that have the potential to underestimate ambient impacts (*e.g.*, not including building downwash). Other options that we select have the potential to either under- or overestimate ambient levels (*e.g.*, location and year of meteorology data and receptor locations). On balance, considering the directional nature of the uncertainties commonly present in ambient concentrations estimated by dispersion models, the approach we apply in the RTR assessments should yield unbiased estimates of ambient HAP concentrations. The uncertainties attributed to dispersion modeling in RTR assessments were assessed by EPA's Science Advisory Board (SAB) and deemed suitable and appropriate.<sup>24</sup> We also note that the selection of meteorology dataset location could have an impact on the risk estimates. For this

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<sup>24</sup> USEPA, 2009a. *Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing*. EPA-452/R-09-006.  
[https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/\\$File/EPA-SAB-10-007-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf)

source category, the two facilities being modeled have ambient air toxics monitors and on-site meteorological stations in place that can be used to help characterize the uncertainty of the emissions modeling. For the Freeport facility, we were unable to collect on-site meteorological data for the 2019 monitor to model comparison; therefore, the model to monitor evaluation was based upon on-site 2011-2012 meteorological data with the 2019 monitoring data. This was not an uncertainty for the Asarco facility, since both model and monitoring comparisons were for 2019. A review of the model to monitor comparisons between the two site(s) can be found in Appendix 1 of the *Residual Risk Assessment for the Primary Copper Smelting Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, report which is available in the docket for this action and Section IV; B-6 of this proposal. As we continue to update and expand our library of meteorological station data used in our risk assessments, we expect to reduce this variability.

#### c. Uncertainties in Inhalation Exposure Assessment

Although every effort is made to identify all of the relevant facilities and emission points, as well as to develop accurate estimates of the annual emission rates for all relevant HAP, the uncertainties in our emission inventory likely dominate the uncertainties in the exposure assessment. Some uncertainties in our exposure assessment include human mobility, using the centroid of each census block, assuming lifetime exposure, and assuming only outdoor exposures. For most of these factors, there is neither an under nor overestimate when looking at the maximum individual risk or the incidence, but the shape of the distribution of risks may be affected. With respect to outdoor exposures, actual exposures may not be as high if people spend time indoors, especially for very reactive pollutants or larger particles. For all factors, we reduce uncertainty when possible. For example, with respect to census-block centroids, we analyze large blocks using aerial imagery and adjust locations of the block centroids to better represent the population in the blocks. We also add additional receptor locations where the population of a block is not well represented by a single location.

#### d. Uncertainties in Dose-Response Relationships

There are uncertainties inherent in the development of the dose-response values used in our risk assessments for cancer effects from chronic exposures and noncancer effects from both chronic and acute exposures. Some uncertainties are generally expressed quantitatively, and others are generally expressed in qualitative terms. We note, as a preface to this discussion, a point on dose-response uncertainty that is stated in the EPA's *2005 Guidelines for Carcinogen Risk Assessment*; namely, that "the primary goal of EPA actions is protection of human health; accordingly, as an Agency policy, risk assessment procedures, including default options that are used in the absence of scientific data to the contrary, should be health protective" (the EPA's *2005 Guidelines for Carcinogen Risk Assessment*, page 1-7). This is the approach followed here as summarized in the next paragraphs.

Cancer UREs used in our risk assessments are those that have been developed to generally provide an upper bound estimate of risk.<sup>25</sup> That is, they represent a "plausible upper limit to the true value of a quantity" (although this is usually not a true statistical confidence limit). In some circumstances, the true risk could be as low as zero; however, in other circumstances the risk could be greater.<sup>26</sup> Chronic noncancer RfC and reference dose values represent chronic exposure levels that are intended to be health-protective levels. To derive dose-response values that are intended to be "without appreciable risk," the methodology relies upon an uncertainty factor (UF) approach,<sup>27</sup> which considers uncertainty, variability, and gaps in the

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<sup>25</sup> IRIS glossary

([https://ofmpub.epa.gov/sor\\_internet/registry/termreg/searchandretrieve/glossariesandkeywords/search.do?details=&glossaryName=IRIS%20Glossary](https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywords/search.do?details=&glossaryName=IRIS%20Glossary)).

<sup>26</sup> An exception to this is the URE for benzene, which is considered to cover a range of values, each end of which is considered to be equally plausible, and which is based on maximum likelihood estimates.

<sup>27</sup> See *A Review of the Reference Dose and Reference Concentration Processes*, U.S. EPA, December 2002, and *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*, U.S. EPA, 1994.

available data. The UFs are applied to derive dose-response values that are intended to protect against appreciable risk of deleterious effects.

Many of the UFs used to account for variability and uncertainty in the development of acute dose-response values are quite similar to those developed for chronic durations. Additional adjustments are often applied to account for uncertainty in extrapolation from observations at one exposure duration (*e.g.*, 4 hours) to derive an acute dose-response value at another exposure duration (*e.g.*, 1 hour). Not all acute dose-response values are developed for the same purpose, and care must be taken when interpreting the results of an acute assessment of human health effects relative to the dose-response value or values being exceeded. Where relevant to the estimated exposures, the lack of acute dose-response values at different levels of severity should be factored into the risk characterization as potential uncertainties.

Uncertainty also exists in the selection of ecological benchmarks for the environmental risk screening assessment. The EPA established a hierarchy of preferred benchmark sources to allow selection of benchmarks for each environmental HAP at each ecological assessment endpoint. We searched for benchmarks for three effect levels (*i.e.*, no-effects level, threshold-effect level, and probable effect level), but not all combinations of ecological assessment/environmental HAP had benchmarks for all three effect levels. Where multiple effect levels were available for a particular HAP and assessment endpoint, we used all of the available effect levels to help us determine whether risk exists and whether the risk could be considered significant and widespread.

For a group of compounds that are unspiciated (*e.g.*, glycol ethers), we conservatively use the most protective dose-response value of an individual compound in that group to estimate risk. Similarly, for an individual compound in a group (*e.g.*, ethylene glycol diethyl ether) that does not have a specified dose-response value, we also apply the most protective dose-response value from the other compounds in the group to estimate risk.

e. Uncertainties in Acute Inhalation Screening Assessments

In addition to the uncertainties highlighted above, there are several factors specific to the acute exposure assessment that the EPA conducts as part of the risk review under section 112 of the CAA. The accuracy of an acute inhalation exposure assessment depends on the simultaneous occurrence of independent factors that may vary greatly, such as hourly emissions rates, meteorology, and the presence of a person. In the acute screening assessment that we conduct under the RTR program, we assume that peak emissions from the source category and reasonable worst-case air dispersion conditions (*i.e.*, 99<sup>th</sup> percentile) co-occur. We then include the additional assumption that a person is located at this point at the same time. Together, these assumptions represent a reasonable worst-case actual exposure scenario. In most cases, it is unlikely that a person would be located at the point of maximum exposure during the time when peak emissions and reasonable worst-case air dispersion conditions occur simultaneously.

#### f. Uncertainties in the Multipathway and Environmental Risk Screening Assessments

For each source category, the Agency generally relies on site-specific levels of PB-HAP or environmental HAP emissions to determine whether a refined assessment of the impacts from multipathway exposures is necessary or whether it is necessary to perform an environmental screening assessment. This determination is based on the results of a three-tiered screening assessment that relies on the outputs from models – TRIM.FaTE and AERMOD – that estimate environmental pollutant concentrations and human exposures for five PB-HAP (dioxins, POM, mercury, cadmium, and arsenic) and two acid gases (HF and HCl). For lead, the Agency uses AERMOD to determine ambient air concentrations, which are then compared to the secondary NAAQS standard for lead. Two important types of uncertainty associated with the use of these models in RTR risk assessments and inherent to any assessment that relies on environmental modeling are model uncertainty and input uncertainty.<sup>28</sup>

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<sup>28</sup> In the context of this discussion, the term “uncertainty” as it pertains to exposure and risk encompasses both *variability* in the range of expected inputs and screening results due to existing spatial, temporal, and other factors, as well as *uncertainty* in being able to accurately estimate the true result.

Model uncertainty concerns whether the model adequately represents the actual processes (e.g., movement and accumulation) that might occur in the environment. For example, does the model adequately describe the movement of a pollutant through the soil? This type of uncertainty is difficult to quantify. However, based on feedback received from previous EPA SAB reviews and other reviews, we are confident that the models used in the screening assessments are appropriate and state-of-the-art for the multipathway and environmental screening risk assessments conducted in support of RTRs. For example, the SAB found that the general methodology of the tiered screening approach and the use of TRIM.FaTE and AERMOD are appropriate for both multipathway and ecological screening tools. The SAB noted the simplicity of the air dispersion treatment in TRIM.FaTE and encouraged the advancement of incorporating AERMOD analysis within the TRIM.FaTE framework.<sup>29</sup>

Input uncertainty is concerned with how accurately the models have been configured and parameterized for the assessment at hand. For Tier 1 of the multipathway and environmental screening assessments, the EPA configured the models to avoid underestimating exposure and risk. This was accomplished by selecting upper-end values from nationally representative datasets for the more influential parameters in the environmental model, including selection and spatial configuration of the area of interest, lake location and size, meteorology, surface water, soil characteristics, and structure of the aquatic food web. The EPA also assumes an ingestion exposure scenario and values for human exposure factors that represent reasonable maximum exposures.

In Tier 2 of the multipathway and environmental screening assessments, we refine the model inputs to account for meteorological patterns in the vicinity of the facility versus using upper-end national values, and we identify the actual location of lakes near the facility rather

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<sup>29</sup> USEPA, 2018. Review of EPA's draft technical report entitle Screening Methodologies to Support Risk and Technology Review (RTR): A Case Study Analysis; EPA-SAB-18-004. [https://yosemite.epa.gov/sab/sabproduct.nsf/LookupWebReportsLastMonthBOARD/7A84AADF3F2FE04A85258307005F7D70/\\$File/EPA-SAB-18-004+.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/LookupWebReportsLastMonthBOARD/7A84AADF3F2FE04A85258307005F7D70/$File/EPA-SAB-18-004+.pdf)

than the default lake location that we apply in Tier 1. By refining the screening approach in Tier 2 to account for local geographical and meteorological data, we decrease the likelihood that concentrations in environmental media are overestimated, thereby increasing the usefulness of the screening assessment. In Tier 3 of the screening assessments, we refine the model inputs again to account for hour-by-hour plume-rise and the height of the mixing layer. The EPA can also use those hour-by-hour meteorological data in a TRIM.FaTE run using the screening configuration corresponding to the lake location. These refinements produce a more accurate estimate of chemical concentrations in the media of interest, thereby reducing the uncertainty with those estimates. The assumptions and the associated uncertainties regarding the selected ingestion exposure scenario are the same for all three tiers.

For the environmental screening assessment for acid gases, we employ a single-tiered approach. We use the modeled air concentrations and compare those with ecological benchmarks.

For all tiers of the multipathway and environmental screening assessments, our approach to addressing model input uncertainty is generally cautious. We choose model inputs from the upper end of the range of possible values for the influential parameters used in the models, and we assume that the exposed individual exhibits ingestion behavior that would lead to a high total exposure. This approach reduces the likelihood of not identifying high risks for adverse impacts.

Despite the uncertainties, when individual pollutants or facilities do not exceed screening threshold emission rates (*i.e.*, screen out), we are confident that the potential for adverse multipathway impacts on human health is very low. On the other hand, when individual pollutants or facilities do exceed screening threshold emission rates, it does not mean that impacts are significant, only that the Agency cannot rule out that possibility and that a refined assessment for the site might be necessary to obtain a more accurate risk characterization for the source category.

The EPA evaluates the following HAP in the multipathway and/or environmental risk screening assessments, where applicable: arsenic, cadmium, dioxins/furans, lead, mercury (both inorganic and methyl mercury), POM, HCl, and HF. These HAP represent pollutants that can cause adverse impacts either through direct exposure to HAP in the air or through exposure to HAP that are deposited from the air onto soils and surface waters and then through the environment into the food web. These HAP represent those HAP for which the Agency can conduct a meaningful multipathway or environmental screening risk assessment. For other HAP not included in our screening assessments, the model has not been parameterized such that it can be used for that purpose. In some cases, depending on the HAP, the Agency may not have appropriate multipathway models that allow us to predict the concentration of that pollutant. The EPA acknowledges that other HAP beyond these that we are evaluating may have the potential to cause adverse effects and, therefore, the EPA may evaluate other relevant HAP in the future, as modeling science and resources allow.

#### **IV. Analytical Results and Proposed Decisions**

##### *A. What actions are we taking pursuant to CAA sections 112(d)(2) and 112(d)(3)?*

In this proposal, the EPA is proposing the following standards pursuant to CAA section 112(d)(2) and (3) for the major source NESHAP (40 CFR part 63, subpart QQQ):

- PM limits for anode refining point sources at existing and new sources.
- PM limits for process fugitive emissions from rooflines of smelting furnaces at existing and new sources.
- PM limits for process fugitive emissions from converters at existing and new sources.
- PM limits for process fugitive emissions from roof vents at anode refining operations at existing and new sources.
- Mercury limits for any existing and new combination of stacks or other vents from the copper concentrate dryers, converting department, the anode refining department, and the smelting vessels affected sources.



- PM limits for new converters.

The results and proposed decisions based on the analyses performed pursuant to CAA section 112(d)(2) and (3) are presented below. When addressing previously unregulated HAP emission sources or unregulated HAP from previously regulated sources in the proposed rule, we apply the MACT methodology, as described in section II.A above.

#### 1. Anode Refining Point Source Emissions

The 1998 proposal for primary copper smelting identified anode refining in the definition of primary copper smelters. However, at that time, the EPA said there were insufficient data to set an emission limit for anode refining. Therefore, the Agency did not propose specific emission standards for anode copper refining operations in the major source NESHAP at that time. In contrast, the 2007 area source NESHAP for primary copper smelting (subpart EEEEEEE) does include emissions standards for anode refining. We conclude that anode refining is part of the source category and emits HAP emissions. Therefore, pursuant to CAA section 112(d)(2) and (3), the Agency is proposing to revise the 2002 major source NESHAP to include emission limits for new and existing anode refining point sources. We have anode refining point source test data from only one source, and because there are less than 30 sources in the category, the MACT floor is based on the average performance of the best 5 sources (in this case, the upper predictive limit (UPL) for the best single source because the Agency only has test data from one source). Using available test data, we are proposing a MACT floor PM limit as a surrogate for particulate metal HAP, which includes, but is not limited to, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium compounds. This approach is consistent with the approach used to limit metal HAP emissions from the other copper smelting processes. A detailed analysis and documentation of the MACT floor calculations can be found in the technical document, *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*. The MACT floor emissions limit was calculated based on the average of the emissions tests, accounting for variability using the 99 percent UPL. The MACT floor limit for the anode

refining point source emissions for existing and new sources is 5.8 milligrams per dry standard cubic meter (mg/dscm).

We identified one BTF option to further reduce PM emissions from anode refining furnaces point sources. The BTF option would require the two facilities to each install and operate a wet electrostatic precipitator (ESP) in addition to their existing controls (baghouses). We estimated that emissions of lead would be reduced by about 0.8 tpy and arsenic emissions would be reduced by about 0.3 tpy. For the 2 existing facilities to comply with this BTF standard, we estimated capital costs of \$72 million and annualized costs of \$9.6 million for a cost effectiveness of \$8.7 million per ton of HAP metal reduced. Regarding new sources, the MACT floor control technology would be a baghouse since the current best performing source is controlled with a baghouse, and the BTF control option for new sources would also be the same as existing (*i.e.*, new source BTF option is based on the addition of a Wet ESP on top of the baghouse). Therefore, we assume the costs for a new source would also be about the same (*i.e.*, \$38 million capital, with annualized costs of \$4.8 million). The Agency cannot estimate a precise cost effectiveness number because it would depend on unknown factors (such as concentration of HAP metals in the ore and/or other input materials used by a new source). Therefore, the Agency assumes the cost effectiveness for new sources would be roughly the same as for existing sources described above. Based on this analysis, the Agency is not proposing this BTF option for existing or new sources because of the relatively high costs and poor cost effectiveness.

Based on the analyses described above, the Agency is proposing to revise the 2002 NESHAP to include the following MACT floor-based emission limits for anode refining point sources:

- For existing anode refining point sources located at primary copper smelting facilities, we are proposing a PM emissions limit of 5.8 mg/dscm.
- For new anode refining point sources located at primary copper smelting facilities, we are proposing a PM emissions limit of 5.8 mg/dscm.

We propose that compliance with the PM emissions limit for anode refining will be demonstrated through an initial compliance test followed by a compliance test at least once every year.

## 2. Process Fugitive Roof Vents

The major source NESHAP currently does not include standards for process fugitive emissions from the rooflines of smelting furnaces, converters, or anode refining operations, with the exception of an opacity limit for converter roof vents that applies during testing. We note that some of these rooflines are among the main sources driving risks as described in the discussion of the risk results in section IV.B. Pursuant to CAA section 112(d)(2) and (3), the EPA is proposing to revise the 2002 NESHAP to include emission limits for rooflines for smelting furnaces, converters, and anode refining at existing and new sources

For smelting furnace and converter rooflines, we evaluated the potential to establish MACT floor emissions limits for PM, as a surrogate for HAP metals, which includes, but is not limited to, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium compounds, based on available test data. While the Agency only had test data for one of the two facilities (*i.e.*, Freeport), the Agency used those data for calculating MACT floor PM limits for converters and smelting furnaces using the UPL methodology. Establishing PM as a surrogate for HAP metals is consistent with the approach used to limit metal HAP emissions from the other copper smelting processes in the current NESHAP and for many other source categories (*i.e.*, Ferroalloys Production, Integrated Iron and Steel Manufacturing, Iron and Steel Foundries). Based on our analyses, we calculated a MACT floor emissions limit of 1.7 lbs/hr PM for process fugitive emissions for existing and new converter rooflines and a MACT floor limit of 4.3 lbs/hr PM for existing and new smelting furnaces rooflines.

The EPA also evaluated BTF PM limits for smelting furnace and converter rooflines based on the potential addition of capture and control equipment designed to achieve approximately 90 percent reduction in process fugitive emissions. With regard to smelting

furnaces, based on available information, we estimate that 1.2 tpy year of HAP metals are emitted from the smelting flash furnace at Asarco. Freeport has two smelting furnaces. Freeport already has primary and secondary capture systems that capture and control process fugitives, resulting in total estimated HAP metal emissions from both furnaces of 0.626 tpy based on available test data, or about half of the emissions from Asarco's furnace. Asarco has primary capture and control and some secondary capture and control, but based on available reported emission estimates, Asarco emits significantly more HAP metals than Freeport. For the BTF option, we evaluated the potential to add enhanced, improved capture and control equipment to achieve about 90 percent reduction of HAP metal emissions from the Asarco smelting flash furnace (*i.e.*, reduce estimated HAP metal emissions from 1.2 tpy to about 0.12 tpy). To achieve 90 percent reduction of process fugitives from the rooflines, the Agency assumes additional secondary capture and/or enhanced capture (*e.g.*, hooding, duct work, fans, etc.) would be needed for at least one operation (*i.e.*, matte tapping/pouring). We think another significant source of fugitives is the material transfer operation, which includes movement of a large ladle containing very hot liquid matte from the flash furnace tapping/pouring operation by an overhead crane to the converters after each tapping/pouring operation. To capture these fugitive emissions from the material transfer operations, we assume a roof ventilation capture system would be needed. We also assume a new baghouse (or other PM collection control device) would be needed to handle these additional exhaust gases. Another potential source of fugitives is the pouring/tapping of slag, but we are assuming 90 percent reduction could be achieved by adding a secondary capture and/or enhanced capture system to reduce fugitive emissions from at least one operation, such as the matte tapping/pouring, without adding capture and control equipment to the slag operation. Therefore, no costs are estimated for capturing fugitives from the slag pouring process.

Furthermore, to comply with this BTF option for smelting furnaces, we estimate Freeport would also need to reduce HAP emissions. If the standard was based on total emissions from

smelting furnaces, we estimate Freeport would need to achieve 80 percent reduction (*e.g.*, from 0.626 to 0.12 tpy, which is the target level described above for the Asarco smelting furnace). To achieve this level of additional reductions of process fugitive emissions, we assume Freeport would need to install two roof ventilation capture systems, one for each of its two furnaces. Further details of this beyond the floor analysis are provided in the technical memo *Evaluation of Beyond-the-floor and Ample Margin of Safety Control Options and Costs for Process Fugitive Emissions from Smelting Furnaces and Converters, and for Point Source Emissions from Anode Refining Furnaces and for the Combined Emissions Stream Emitted from the Freeport Aisle Scrubber*, which is available in the docket for this action.

Based on this analysis, the Agency estimates the BTF PM limit of 0.12 tpy for existing sources would have total capital costs of \$26,501,600 and annualized costs of \$5,443,937 and would achieve about 1.53 tpy reduction of HAP metals, with cost effectiveness of \$3,445,529 per ton of HAP metal reduction. With regard to new sources (*i.e.*, new furnaces), since the MACT Floor limit is based on test data from Freeport, the Agency assumes the BTF controls for a new furnace would be similar to the BTF controls described above for Freeport (*i.e.*, need to install a roof ventilation capture system on top of whatever controls they need to meet the MACT Floor level of control for each new furnace). Based on costs estimated for Freeport, and applying this to a potential new source, the estimated costs for BTF option for a new furnace would be \$3,700,000 capital and annualized costs of \$600,000 and achieve about 0.25 tpy metal HAP reduction, with cost effectiveness of \$2,400,000 per ton of HAP. Further information and details regarding the MACT floor and BTF analyses are provided in the memorandum titled *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*, and in the costs memo cited above, which are available in the docket for this proposed action.

With regard to converters, Asarco has three converters and Freeport has four converters. Asarco already has primary, secondary and tertiary capture and controls, and the reported total estimated HAP emissions are 0.0000022 tpy. On the other hand, Freeport has primary and

secondary capture and controls, but no tertiary controls, and the total estimated HAP emissions from Freeport converters are 0.115 tpy. Therefore, we considered proposing a BTF option for existing converters for the source category that would require reductions at Freeport based on installation of tertiary controls which would be similar to the tertiary capture and controls on the converters at Asarco or the roof ventilation capture system described in the BTF analysis above for Freeport smelting furnaces. Given that all four converters at Freeport are in the same building, we assume that one such system would be sufficient to achieve about 80 percent reduction of fugitives. We assume Freeport could route these additional emissions to current control devices, since they already have two such control systems (*i.e.*, scrubbers). Therefore, we are not including an additional baghouse for this potential BTF control option. Based on the analysis described above, the Agency estimates this potential BTF standard for existing converters would have total capital costs of \$3,697,200 and annualized costs of \$599,663, and achieve about 0.09 tpy reduction of HAP metals, with cost effectiveness of \$6,662,928 per ton of HAP metal reduction.

With regard to potential BTF standards for process fugitive emissions from roof vents for new converters, it is difficult to determine the appropriate standard because of a number of issues and uncertainties. First, based on reported emissions described above, Asarco has substantially lower HAP metal emissions as compared to Freeport. However, we have no test data for Asarco, so we have low confidence in these reported emissions estimates. Second, as described above, the current NESHAP prohibits new sources from using batch converters. Therefore, we assume any new converter would be a continuous converter, and we have no test data or even estimates of process fugitive emissions from continuous converter building roof vents. Based on this lack of information, we assume the BTF limit and associated costs for process fugitives for new sources would be the same as the BTF limit and associated costs for existing sources described in the paragraph above.

The EPA also evaluated the potential to establish MACT floor limits, or BTF limits, for HAP metals based on establishing additional opacity limits in the NESHAP for each affected source. For example, we considered proposing opacity limits consistent with the state air permits and opacity limits in the Consent Decree (CD) for Asarco as potential MACT standards in addition to, or instead of, the MACT floor PM limits. The opacity limits are not expected to result in emission reductions. Instead, the opacity would be monitored to ensure that the process equipment and control devices are operating properly. Furthermore, there would be no additional costs associated with establishing these opacity limits, since the limits would be consistent with what the facilities are already complying with under the state air permits or a CD. There is variability in opacity limits in the state air permits and CD and uncertainty as to what specific opacity limits represent MACT floor and BTF for each of the processes. These opacity limits are described in detail in the memorandum titled *Opacity Standards for Major Primary Copper Smelting Facilities*, which is available in the docket.

Based on the above analyses, we are proposing the MACT floor PM emissions limits as a surrogate for metal HAP for converter and smelting furnace roof vents. The Agency is not proposing the BTF limits for converters or smelting furnaces because of the high costs and poor cost effectiveness and uncertainties in the estimates of emissions, emissions reductions and costs. Furthermore, the Agency is not proposing the opacity limits at this time due to variability in opacity limits in the state air permits and CD and uncertainty as to what specific opacity limits represent MACT floor and BTF for each of the processes. Nevertheless, the EPA solicits comments regarding the opacity limits, including whether it would be appropriate to establish opacity limits (such as the opacity limits in the state air permits and CD) in the NESHAP in addition to, or instead of, the numeric PM MACT floor emissions limits described above, and, if so, an explanation as to how or why these opacity limits reflect MACT floor, or BTF, levels of control. The Agency also solicits comments, data and other information regarding the MACT Floor analyses and BTF analyses, and our proposed determinations described above.

With regard to process fugitive emissions from anode refining roof vents, we estimate that Freeport emits 5.22 tpy of total metal HAP, comprised mainly of lead (4.09 tpy) and arsenic (0.622 tpy), and that Asarco emits 0.1076 tpy of total metal HAP. To develop a proposed standard for this source, we initially calculated a MACT floor emissions limit for PM of 15.2 lbs/hr based on available test data and application of the UPL methodology. For this standard, PM serves as a surrogate for all particulate HAP metals, similar to the other PM limits in the NESHAP.

Subsequently, we evaluated a potential BTF PM emissions limit for the anode refining roof vents, which would be set at a level approximately 90 percent lower than the MACT floor limit. Based on these analyses, which are described in detail in the *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category* memorandum, which is available in the docket, the BTF emissions limit for PM is 1.6 lbs/hr. Based on available data, to comply with this BTF limit, we expect the Freeport facility would need to install improved capture systems, including hoods, ductwork, and fans, and one additional baghouse to reduce process fugitive emissions from anode refining roof vents. We anticipate the improved capture systems would need to be applied to four units, including the two anode refining furnace pouring operations, the anode casting wheel, and the holding vessel. However, the facility might identify other methods or approaches to reduce these emissions, such as applying these equipment to only a subset of the four units, limiting the input of certain raw materials that have relatively high HAP metal content (such as acid plant sludge) into the process, and/or converting their holding vessel into an enclosed, controlled anode refining furnace. The Agency expects that the capture, control and/or other measures the facility adopts to reduce metal HAP emissions from roof vents on anode refining buildings to meet the BTF limit will also significantly reduce human health risks (*e.g.*, due to lead and arsenic emissions) as discussed below in section IV.C.2.

The Agency estimates that total costs for Freeport to comply with this BTF PM emissions limit would be capital costs of \$5,887,000 and annualized costs of \$1,558,000, and would



achieve about 4.25 tpy reduction of lead and arsenic emissions, with cost effectiveness of \$367,000 per ton of lead and arsenic reduction. Lead and arsenic account for more than 90 percent of the HAP metal emissions from the roof vents on the anode refining building at Freeport. This cost effectiveness estimate is within the range of cost effectiveness values that EPA has historically considered acceptable for lead when compared to similar prior rulemakings. For example, in the 2012 Secondary Lead Smelting RTR, EPA accepted a cost effectiveness up to about \$1.3M/ton for metal HAP (mainly Pb, based on 2009 dollars). The EPA's consideration of the cost effectiveness estimate of \$367,000 per ton of lead and arsenic (noted above) also reflects fact-specific circumstances for addressing lead and arsenic emissions from the Primary Copper Smelting source category. For example, in other instances when the focus is on controlling other pollutants, such as PM, the agency would compare to other cost-effectiveness values. It is also important to note that cost effectiveness is but one factor we consider in assessing the cost of the emission reduction at issue here. See *NRDC v. EPA*, 749 F.3d 1055, 1060 (D.C. Cir. April 18, 2014) ("Section 112 does not command EPA to use a particular form of cost analysis."). We also consider other factors in assessing the cost of the emission reduction as part of our BTF analysis, including, but not limited to, total capital costs, annual costs and costs compared to total revenues (*e.g.*, costs to revenue ratios). As explained in section V.D., the estimated total annualized costs for Freeport are about 0.016 percent of the annual revenue of the facility's ultimate parent company in 2019. Furthermore, based on Freeport's existing permit, background information in a consent order with the state of Arizona (which are available in the docket), and discussions with facility representatives, improvements to their anode refining capture and control systems are already being considered. Because estimated HAP metals emissions from Asarco are much lower, they would not be expected to incur additional control costs to meet the BTF limit. However, Asarco would have new costs for compliance testing and recordkeeping and reporting, as described below. Overall, the EPA concludes that these costs are not economically significant and the cost effectiveness is within the range accepted in other

NESHAP for these types of HAP metals (*e.g.*, Secondary Lead RTR Proposed Rule, 76 FR 99, 29032, May 19, 2011, and the Final rule, 77 FR 3, 556, January 5, 2012).

The Agency also considered proposing a BTF lead emissions limit in addition to, or instead of, the PM limit since lead is the primary HAP metal emitted from the anode refining roof vents. For example, the Agency considered a possible lead limit of approximately 0.26 lbs/hr as a potential BTF MACT limit for anode refining process fugitive emissions, which is described in the MACT Floor memo cited above. However, there is some uncertainty with this analysis. It was not clear how best to apply the EPA's UPL methodology to the available lead emissions data to appropriately account for variability and determine a lead UPL limit that would reflect the MACT floor level of control, and to then subsequently determine what lead limit would represent a 90 percent reduction from the lead MACT Floor. The EPA expects the costs and reductions for such a lead BTF limit would be the same as the costs and reductions for the BTF option for PM described in the above paragraph. If the Agency was to establish such a lead limit instead of a PM limit, it would also serve as a surrogate for all HAP metals, similar to the Secondary Lead Smelting NESHAP, which established emissions limits for lead that serve as surrogates for all particulate HAP metals. Due to the uncertainties with the analysis of lead emissions and methodology used to develop the lead UPL limit, the Agency is not proposing this lead limit at this time. However, the EPA solicits comments regarding this potential lead limit and whether it would be appropriate to establish such a lead limit in addition to, or instead of, the PM limit, and if so, why?

Further information and details regarding the derivation of the MACT floor and BTF limits are provided in the memorandum titled *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*. Further information and details regarding the cost estimates for Freeport to comply with the BTF limits for the anode refining process fugitives roof vents are described in the memorandum *Development of Estimated Costs for Enhanced Capture and*

*Control of Process Fugitive Emissions from Anode Refining Operations at Freeport*, which is available in the docket for this proposed action.

Based on the analyses described above, the Agency is proposing a BTF emissions limit for PM of 1.6 lbs/hr for anode refining process fugitive emissions at existing and new sources.

In summary, based on the analyses described above, the Agency is proposing to revise the 2002 NESHAP to include the following emission limits for process fugitive HAP metal emissions from roof vents of smelting furnaces, converters, and anode refining processes located at primary copper smelting facilities, as follows:

- For existing and new converter operations located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 1.7 lbs/hr for process fugitive roof vents.
- For existing and new smelting furnaces located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 4.3 lbs/hr for process fugitive roof vents.
- For existing and new anode refining operations located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 1.6 lbs/hr for process fugitive roof vents.

The Agency is proposing that compliance with these emissions limits for smelting furnaces, converters and anode refining will be demonstrated through an initial compliance test followed by a compliance test at least once every year. Moreover, facilities will need to monitor various control parameters (*e.g.*, fan speed, amperage, pressure drops, and/or damper positioning) on a continuous basis to ensure the fugitive capture system and controls are working properly.

With regard to testing and recordkeeping costs, the Agency estimates Asarco will have total costs of about \$95,000 per year for all the testing and recordkeeping and reporting to demonstrate compliance with these proposed three new standards for the process fugitive emissions roof vents for the converters, smelting furnaces and anode refining processes. As

mentioned above, Freeport will have no new testing costs since they already conduct this testing per ADEQ requirements.

### 3. Mercury

As mentioned above, the 2002 NESHAP does not include emission limits for mercury. The source category emits an estimated 55 pounds of mercury annually with 45 pounds per year emitted from the Freeport facility. Because of the temperatures of exhaust gas streams encountered at primary copper smelting operations, much of the mercury emitted is in vapor form, not in a particulate form. The vapor form of mercury is not captured by the controls used to reduce PM emissions. Therefore, the PM limits do not serve as a surrogate for mercury. Pursuant to CAA section 112(d)(2) and (3), the Agency is proposing to revise the 2002 NESHAP to include emission limits for mercury.

Initially the Agency calculated MACT floor limits based on test data from both of the primary copper smelting facilities. A detailed analysis and documentation of the MACT floor calculations can be found in the technical document, *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*, available in the docket.

The MACT floor emissions limit for existing sources was calculated based on the average of all the emissions tests from both facilities, accounting for variability using the 99 percent UPL. A MACT floor based on the 99 percent UPL for the combined facility-wide limit for existing sources is 0.01 lbs/hr. Based on available data, the Agency concludes that both facilities would be able to meet the MACT floor limit with no additional controls.

For new sources, the Agency calculated a MACT floor limit of 0.00097 lbs/hr based on emissions data from the best performing (or lowest emitting) facility, which is Asarco.

We then evaluated and considered a BTF option to further reduce emissions of mercury from existing furnaces and converters. Based on available test data, the Agency estimates that the acid plant is by far the largest source of mercury emissions at Freeport, accounting for about 64 percent of the total, with an estimated 29 lbs/yr of mercury emissions. The BTF option for

existing sources would require the Freeport facility to install and operate an activated carbon injection (ACI) system and a polishing baghouse on the combined stack emissions release point, the acid plant. The Agency estimates the ACI system would achieve approximately 90 percent reduction of mercury from the acid plant stack (*i.e.*, 26 lbs/yr reduction of mercury). Therefore, the BTF emissions limit would be 0.0043 lbs/hr, which reflects a 90 percent reduction from the acid plant portion of the UPL MACT floor level of 0.01 lbs/hr described above.

The EPA estimates that these controls would achieve 26 pounds of mercury reductions per year (*i.e.*, 90 percent reduction of emissions from the acid plant), at a capital cost of \$1.5 million and annualized costs of \$714,000 (in 2019 dollars) for a cost effectiveness of \$27,500 per pound of mercury reduced. After considering both the MACT floor and BTF options for existing sources, the EPA is proposing the BTF facility-wide emissions limit for mercury of 0.0043 lbs/hr for existing sources. The EPA is proposing this BTF limit for mercury because mercury is a highly toxic, persistent and bioaccumulative HAP and the estimated cost effectiveness is within the range of cost effectiveness values the EPA has previously considered acceptable for this HAP after correcting to dollar year values. For example, in the 2012 Mercury and Air Toxics (MATS) final rule, EPA finalized a BTF standard for mercury that had cost effectiveness of \$22,496 per pound (based on 2007 dollars), which would be about \$27,500 per pound based on 2019 dollars (see *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, December 2011, on pages 1-9 and 1-10, available at: <https://www.epa.gov/mats/epa-announces-mercury-and-air-toxics-standards-mats-power-plants-technical-information>).

A detailed analysis and documentation of the BTF option for the Primary Copper Smelting major source NESHAP and cost calculations can be found in the technical document, *Estimated Costs for Beyond-the-floor Controls for Mercury Emissions from Primary Copper Smelting Facilities*, available in the docket for this action.

With regard to new sources, as described above, the MACT floor for new sources (*i.e.*, 0.00097 lbs/hr) is already significantly lower than the BTF limit for existing sources (*i.e.*, 0.0043

lbs/hr). The EPA evaluated a potential BTF option to further reduce emissions of mercury from new furnaces and converters. This analysis is very similar to that described above for existing furnaces and converters, which would require the installation and operation of at least one ACI system plus a polishing baghouse on a combined emissions stream from the converter and furnace. Therefore, the EPA assumes the costs for a beyond the floor option for a new source could be the same as shown above for Freeport. With regard to numerical emissions limit, if the Agency assumes the same percentage reduction from the new source MACT floor (*i.e.*, 0.00097 lbs/hr) that the Agency described above for existing sources, that would result in a BTF limit for new sources of 0.00042 lbs/hr.

However, with regard to reductions, it is impossible to accurately estimate potential reductions in mercury from a new source without knowing more information regarding a potential new source. For example, mercury emissions are highly dependent on the concentration of mercury in the ore and mercury concentrations can vary significantly across different ore bodies. If the EPA assumes a new source would have similar ore as Asarco, which has much lower mercury emissions compared to Freeport, the costs for controls could be similar to those estimated for Freeport above. However, the emissions reductions would be far lower, and therefore the controls would probably not be cost effective. If, on the other hand, the ore was similar to Freeport's, it may not be feasible for such a facility to achieve a limit of 0.00042 lbs/hr) with these types of controls. For example, if such a facility had characteristics similar to Freeport, they would likely need to achieve far greater reductions than 90 percent from the acid plant to achieve a limit of 0.00042 lbs/hr, which would require additional controls beyond the ACI system and polishing baghouse described above.

Given these uncertainties described above, and the fact that the new source MACT floor limit (*i.e.*, 0.00097 lbs/hr) is already significantly lower than the BTF limit for existing sources of 0.0043 lbs/hr, the Agency is proposing a MACT floor limit for mercury for new sources of 0.00097 lbs/hr. More details are provided in the memorandums titled *Draft MACT Floor*

*Analyses for the Primary Copper Smelting Source Category and Estimated Costs for Beyond-the-floor Controls for Mercury Emissions from Primary Copper Smelting Facilities*, which are available in the docket for this action.

Based on the analysis described above, the Agency is proposing to revise the 2002 NESHAP to include the following emission limits for mercury:

- For existing primary copper smelting facilities, the Agency is proposing a facility-wide BTF emissions limit for mercury of 0.0043 lbs/hr.
- For new primary copper smelting facilities, the Agency is proposing a facility-wide MACT Floor emissions limit for mercury of 0.00097 lbs/hr.

The EPA is proposing that compliance with the mercury emissions limits for existing sources will be demonstrated through an initial compliance test for each of the affected sources (*e.g.*, furnaces, converters, anode refining) within 3 years of publication of the final rule followed by a compliance test at least once every year. The actual number of tests required will depend on the specific configurations of the emissions capture and control equipment and number of release points at each facility. For affected facilities that commence construction or reconstruction after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, owners or operators must comply with all requirements of the subpart, including all the amendments being proposed, no later than the effective date of the final rule or upon startup, whichever is later.

The EPA solicit comments, information and data regarding the proposed standards for mercury, and the relevant technical analyses described above, as well as the proposed compliance dates and testing requirements.

#### 4. New Source Limits for Converters in the Major Source NESHAP

The current requirement for new copper converters is that the NESHAP prohibits the use of batch copper converters. By default, new copper converters covered by the NESHAP would need to be continuous converters, or some other unknown non-batch converter technology, but the rule does not include an actual standard for new converters. Therefore, pursuant to CAA

section 112(d)(2) and (3), the Agency is proposing to revise the 2002 NESHAP to include emission limits for new converters. We note that there are no existing continuous converters in the major source category, and, therefore, the Agency is not establishing an emissions limit for existing sources. The Agency is proposing a PM with a diameter less than 10 micrometers (PM<sub>10</sub>) emissions limit as a surrogate for metal HAP based on PM<sub>10</sub> test data from the Kennecott facility which is an area source subject to 40 CFR part 63, subpart EEEEEEE, area source rule. Therefore, the limit is based on the performance of the best similar source, which is the Kennecott primary copper smelting facility. The proposed input-based emissions limit would require the discharge of total PM<sub>10</sub> to be no greater than 0.031 pounds of PM<sub>10</sub> per ton of copper concentrate feed charged to the smelting vessel. A detailed discussion of the selection of the new source limit can be found in the preamble to the proposed rule for subpart EEEEEEE (71 FR 59307, 59310, October 6, 2006). The calculation of the limit of 0.031 lbs of PM<sub>10</sub> per ton of copper concentrate feed is described in the technical memo titled: *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*.

We then evaluated whether there are any potential BTF options to further limit PM<sub>10</sub> emissions from new converters; however, we did not identify any BTF options. Therefore, we are proposing a limit of 0.031 pounds of PM<sub>10</sub> per ton of copper concentrate feed charged to the smelting vessel.

The EPA proposes that compliance with the PM<sub>10</sub> emissions limit for new converters would be demonstrated through an initial compliance test followed by a compliance test at least once every year.

#### *B. What are the results of the risk assessment and analyses?*

##### 1. Chronic Inhalation Risk Assessment Results

Table 1 of this preamble provides a summary of the results of the inhalation risk assessment for the source category. The two facilities in this major source category are located in Arizona in a rural, desert environment that is, for the most part, sparsely populated. More



detailed information on the risk assessment can be found in the document titled *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, available in the docket for this rule.

**Table 1. Primary Copper Smelting Major Source Category Inhalation Risk Assessment Results**

Number of Facilities <sup>1</sup>	Maximum Individual Cancer Risk (in 1 million) <sup>2</sup> based on...		Population at Increased Risk of Cancer ≥ 1-in-1 Million based on...		Annual Cancer Incidence (cases per year) based on...		Maximum Noncancer HI and 3-month Lead Concentration (ug/m <sup>3</sup> ) <sup>3</sup>		Maximum Screening Acute Noncancer HQ <sup>4</sup> based on...
	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions
2	80	90	26,125	29,001	0.003	0.003	HI =1 (arsenic) developmental Pb Conc: 0.17	HI =1 (arsenic) developmental Pb Conc: 0.24	HQ (REL) = 7 (Arsenic)

<sup>1</sup> Number of facilities evaluated in the risk analysis.

<sup>2</sup> Maximum individual excess lifetime cancer and noncancer risk due to arsenic emissions from the source category, 71 percent from the anode refining roofline at Freeport and 23 percent from anode furnaces and converters point source emissions from the Aisle Scrubber at Freeport.

<sup>3</sup> The max 3-month off-site lead concentration is compared to the lead (Pb) NAAQS standard of 0.15 ug/m<sup>3</sup> based upon actual and allowable emissions from the source category. The Pb NAAQS standard was developed to address all exposure pathways (inhalation and ingestion).

<sup>4</sup> The maximum estimated off-site acute exposure concentration was divided by available short-term dose-response values to develop an array of HQ values. HQ values shown use the lowest available acute dose-response value, which in most cases is the REL. There are no other acute health benchmarks for arsenic other than the 1-hour REL.

Results of the inhalation risk assessment based on actual emissions indicate that the cancer MIR is 80-in-1 million. The total estimated cancer incidence from this source category is 0.003 excess cancer cases per year, or one excess case every 333 years, with arsenic compounds contributing 95 percent of the cancer incidence for the source category. Approximately 26,125 people of the 46,460 people in the model domain are estimated to have cancer risks above 1-in-1 million from HAP emitted from this source category. The HEM-4 model predicted the maximum chronic noncancer HI value for the source category is equal to 1 (developmental), driven by emissions of arsenic from the anode refining roofline at Freeport and the anode furnaces and secondary converter point source emissions emitted through the Aisle Scrubber at Freeport.

Results of the inhalation risk assessment based on MACT-allowable emissions indicate that the cancer MIR is 90-in-1 million. The total estimated cancer incidence from this source

category is 0.003 excess cancer cases per year, or one excess case every 333 years, with arsenic contributing 90 percent and cadmium contributing 8 percent of the cancer incidence for the source category. Approximately 29,001 people are estimated to have cancer risks above 1-in-1 million from exposure to HAP emissions allowed under the NESHAP. The HEM-4 model predicted the maximum chronic noncancer HI value for the source category is equal to 1 (developmental), driven by emissions of arsenic from the anode refining roofline and the anode furnaces and converters. No individuals are estimated to have exposures that result in a noncancer HI above 1 at allowable emission rates.

A refined modeling analysis was conducted at the facility with the highest annual concentration of lead to characterize ambient concentrations of lead for 3-month intervals. The maximum 3-month concentration was predicted for each off-site receptor. The concentrations were then compared to the Lead (Pb) NAAQS of 0.15 ug/m<sup>3</sup>. The maximum 3-month off-site modeled concentration was 0.17 ug/m<sup>3</sup> for actual emissions and 0.24 ug/m<sup>3</sup> for allowable emissions, and these results occurred near the Freeport facility. The lead standard is based on exposure to all pathways (inhalation and ingestion) due to lead emitted to the air and includes an adequate margin of safety to be protective of all sub-populations at risk, especially children. Lead concentrations above the standard increase the risk of developmental effects for children. Model results indicate that, based on actual emissions, a single census block (about five people) has the potential to be exposed to lead concentrations greater than the lead NAAQS. For allowable emissions, the analysis predicts that eight census blocks (about 50 people) have modeled lead concentrations greater than the lead NAAQS. While the EPA examines the potential for lead risks and exposure by comparing ambient levels directly to the NAAQS, the noncancer risks predicted for this category from arsenic are also associated with developmental effects. Thus, while the Agency did not combine the risk of developmental effects from exposure to lead with the hazard associated with exposure to arsenic, the Agency would expect their combined hazard to be greater than each of the individual exposures and hazards presented

above.

## 2. Screening Level Acute Risk Assessment Results

To better characterize the potential health risks associated with estimated worst-case acute exposures to HAP, and in response to a key recommendation from the SAB's peer review of the EPA's RTR risk assessment methodologies, the Agency examined a wider range of available acute health metrics than the Agency does for our chronic risk assessments. This is in acknowledgement that there are generally more data gaps and uncertainties in acute reference values than there are in chronic reference values. By definition, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for repeated exposures. However, the level of exposure that would cause health effects is not specifically known. Therefore, when an REL is exceeded and an AEGL-1 or ERPG-1 level is available (*i.e.*, levels at which mild, reversible effects are anticipated in the general public for a single exposure), the Agency typically uses them as an additional comparative measure, as they provide an upper bound for exposure levels above which exposed individuals could experience effects. As the exposure concentration increases above the acute REL, the potential for effects increases.

A review of all modeled off-site receptors for the Primary Copper Smelting source category identified exceedance of the 1-hour REL for arsenic, resulting in an HQ of 7 for arsenic. This is for actual baseline emissions. Satellite imagery for this location identifies it as a residential location approximately 4,200 meters northeast of the Freeport facility. It is also important to note that the primary source of the arsenic emissions from the anode furnace/converter and anode refining roofline was modeled with an hourly emissions multiplier of 3 times the annual average emissions rate. There are no AEGL or ERPG levels available for arsenic. No other HAP exposure concentrations exceeded acute benchmarks. Further details on the acute HQ estimates are provided in Appendix 10 of the risk report for this source category.

## 3. Multipathway Risk Screening

For this source category both facilities reported emissions of lead, which are compared to the lead NAAQS, and emissions of PB-HAP, which are compared to the Tier 1 screening threshold emission rate for each PB-HAP based upon a combined fisher/farmer scenario with upper-bound ingestion rates. The two facilities within this source category both reported emissions of carcinogenic PB-HAP (arsenic) and emissions of non-carcinogenic PB-HAP (cadmium and mercury) that exceeded their respective Tier 1 screening threshold emission rates. For facilities that exceed the Tier 1 multipathway screening threshold emission rate for one or more PB-HAP, we use additional facility site-specific information to perform a Tier 2 multipathway screening assessment. For the Tier 2 screening, the farmer and fisher scenarios are not combined as they are in the Tier 1 screening. Instead, the farmer and fisher scenarios are treated as separate individuals with the fisher scenario based upon modeled impacts to local lakes within 50 kilometers of the facility. Further details on the tiered multipathway screening methodology can be found in Appendix 6 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*.

For arsenic, both facilities had Tier 2 SVs (cancer) greater than 1, with a maximum SV of 3,000 for the farmer scenario, a maximum SV of 1,000 for the rural gardener scenario, and a maximum SV of 100 for the fisher scenario. For cadmium, the Tier 2 screening assessment for both the farmer and gardener (rural) scenarios resulted in maximum Tier 2 SVs (noncancer) of 4. For the fisher scenario, Tier 2 noncancer SVs were greater than 1 for mercury compounds and cadmium compounds for one facility with a maximum noncancer SV of 20 for mercury and the maximum noncancer SV of 10 for cadmium.

Based upon these results, a Tier 3 screening assessment was conducted for both the fisher and gardener (rural) scenarios. A Tier 3 screening analysis was performed for arsenic, cadmium, and mercury emissions. In the Tier 3 screen for the fisher scenario, lakes near the facilities were reviewed on aerial photographs. As a result of this assessment, the features that were initially

identified as lakes driving the Tier 2 screening risks for the fisher scenario were found to be tailings basins (not lakes), which are not fishable. After the tailings basins were removed from the fisher scenario analysis, the maximum cancer SV for arsenic emissions was 30, the maximum noncancer SV for mercury emissions was 4, and the maximum noncancer SV for cadmium emissions was 4.

The Tier 3 gardener (rural) scenario was refined with the placement of the garden at the MIR residential receptor location approximately 4 km northeast of the facility versus the worst-case near-field location. Based on these Tier 3 refinements to the gardener scenario, the maximum Tier 3 cancer SV of 1,000 (rounded to 1 significant figure) remained the same for arsenic emissions, while the maximum noncancer SV decreased from 4 to 3 for cadmium emissions. An exceedance of a screening threshold emission rate or SV in any of the tiers cannot be equated with a risk value or an HQ (or HI). Rather, it represents a high-end estimate of what the risk or hazard may be. For example, an SV of 2 for a non-carcinogen can be interpreted to mean that the Agency is confident that the HQ would be lower than 2. Similarly, a Tier 2 cancer SV of 7 means that we are confident that the cancer risk is lower than 7-in-1 million. Our confidence comes from the conservative, or health-protective, assumptions encompassed in the screening tiers: the Agency chooses inputs from the upper end of the range of possible values for the influential parameters used in the screening tiers, and the Agency assumes that the exposed individual exhibits ingestion behavior that would lead to a high total exposure.

The EPA determined that it is not necessary to go beyond the Tier 3 lake and gardener analysis or conduct a site-specific assessment for arsenic, cadmium, and mercury. The EPA compared the Tier 2 screening results to site-specific risk estimates for five previously assessed source categories. These are the five source categories, assessed over the past 4 years, which had characteristics that make them most useful for interpreting the Primary Copper Smelting screening results. For these source categories, the EPA assessed fisher and/or gardener risks for arsenic, cadmium, and/or mercury by conducting site-specific assessments. The EPA used

AERMOD for air dispersion and Tier 2 screens that used multi-facility aggregation of chemical loading to lakes where appropriate. These assessments indicated that cancer and noncancer site-specific risk values were at least 50 times lower than the respective Tier 2 screening values for the assessed facilities, with the exception of noncancer risks for cadmium for the gardener scenario, where the reduction was at least 10 times (refer to EPA Docket ID: EPA-HQ-OAR-2017-0015 and EPA-HQ-OAR-2019-0373 for a copy of these reports).<sup>30</sup>

Based on our review of these analyses, if the Agency was to perform a site-specific assessment for the Primary Copper Smelting Source Category, the Agency would expect similar magnitudes of decreases from the Tier 2 SVs. As such, based upon the conservative nature of the screens and the level of additional refinements that would go into a site-specific multipathway assessment, were one to be conducted, we are confident that the HQ for ingestion exposure, specifically cadmium and mercury through fish ingestion, is less than 1. For arsenic, maximum cancer risk posed by fish ingestion would also be reduced to levels below 1-in-1 million, and maximum cancer risk under the rural gardener scenario would decrease to 20-in-1 million or less. Also, based upon the arid climate of the area and the hypothetical nature/location of the garden, estimated risks from this scenario seem unlikely. Further details on the Tier 3 screening assessment can be found in Appendix 10 - 11 of *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*.

In evaluating the potential for adverse health effects from emissions of lead, the EPA compared modeled maximum 3-month lead concentrations to the secondary NAAQS level for

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<sup>30</sup> EPA Docket records (EPA-HQ-OAR-2017-0015): *Appendix 11 of the Residual Risk Assessment for the Taconite Manufacturing Source Category in Support of the Risk and Technology Review 2019 Proposed Rule*; *Appendix 11 of the Residual Risk Assessment for the Integrated Iron and Steel Source Category in Support of the Risk and Technology Review 2019 Proposed Rule*; *Appendix 11 of the Residual Risk Assessment for the Portland Cement Manufacturing Source Category in Support of the 2018 Risk and Technology Review Final Rule*; *Appendix 11 of the Residual Risk Assessment for the Coal and Oil-Fired EGU Source Category in Support of the 2018 Risk and Technology Review Proposed Rule*; and EPA Docket: (EPA-HQ-OAR-2019-0373): *Appendix 11 of the Residual Risk Assessment for Iron and Steel Foundries Source Category in Support of the 2019 Risk and Technology Review Proposed Rule*.

lead of ( $0.15 \mu\text{g}/\text{m}^3$ ) over a 2-year period. The highest off-site 3-month average lead concentration based upon actual emissions was  $0.17 \mu\text{g}/\text{m}^3$ . The highest concentration based on allowable emissions was  $0.24 \mu\text{g}/\text{m}^3$ . Both results are above the lead NAAQS standard, indicating a potential for adverse health effects from multipathway exposure to lead. For further information on the modeling and monitoring analysis for lead refer to section IV.B.1 (Chronic Inhalation Risk Assessment Results) and section IV.B.6 (Monitor to Model Analysis for Arsenic and Lead).

#### 4. Environmental Risk Screening Results

As described in section III.A of this document, the Agency conducted an environmental risk screening assessment for the primary copper source category for the following pollutants: arsenic, cadmium, and mercury. In the Tier 1 screening analysis for PB-HAP (other than lead, which was evaluated differently), arsenic, cadmium, divalent mercury and methyl mercury exceeded at least one ecological benchmark, requiring a Tier 2 screen.

A Tier 2 screening assessment was performed for arsenic, cadmium, divalent mercury and methyl mercury. Arsenic, divalent mercury, and methyl mercury had no Tier 2 exceedances for any ecological benchmark. Two facilities contributing emissions to the same lake had cadmium emissions that resulted in Tier 2 exceedances for fish no-observed-adverse-effect level (avian piscivores), fish geometric-maximum-allowable-toxicant level (avian piscivores), and fish lowest-observed-adverse-effect level (avian piscivores) benchmarks with a maximum SV of 3.<sup>31</sup>

A Tier 3 screening analysis was performed for cadmium emissions. In the Tier 3 screen, lakes near the facilities were reviewed on aerial photographs. As a result of this assessment, the waterbody that was initially identified as a lake that was driving the Tier 2 environmental screening risks for cadmium was found to be a tailings basin and was removed from the analysis.

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<sup>31</sup> The two facilities in the multipathway analysis are within the same model domain and contribute cadmium emissions to a common lake with the Freeport facility contributing > 99 percent of the cadmium loading to the target lake (USGS ID:26665).

After environmental impacts that had been estimated for the tailings basin were removed from the analysis, there were no exceedances of cadmium environmental screening benchmarks in Tier 3. For lead, the Agency estimated an exceedance of the secondary lead NAAQS at one census block at a lead concentration of  $0.17 \text{ ug/m}^3$ . The exceeded census block constitutes less than 0.1 percent of the modeled area around the facility. Therefore, based on the limited extent of the lead exceedance and the other results of the environmental risk screening analysis, the Agency does not expect an adverse environmental effect as a result of HAP emissions from this source category.

## 5. Facility-Wide Risk Results

The source category includes all the emissions at the facility. Thus, the facility-wide risk is the same as the risk posed by the actual emissions from the source category, refer to Table 1, with no change in incidence or risk drivers.

## 6. Monitor to Model Analysis for Arsenic and Lead

A monitor to model comparison analysis was conducted for the monitors located at both primary copper smelting facilities to characterize the effectiveness of the emissions modeling and for purposes of risk characterization. Monitoring data collected from both sites represent current process operations at the facilities including process fugitives as well as background contributions from historic activity such as road dust and re-entrainment. A review of emission inventories for the area indicates both plants are the primary contributor of arsenic and lead emissions for their locations. Monitoring samples are collected on a one in 6-day schedule for a 24-hour continuous period. This schedule and the number of active source-driven monitors provide an indication of what emission sources may be contributing to the monitor but still do not provide enough temporal resolution to apportion the emissions to a specific source. Because the sample is collected over a 24-hour period, this apportionment is further complicated by factors such as varying surface winds (wind speed and wind direction) that occur throughout the day as well as unexpected changes in production or upset events that may occur at the plant.



The Hayden area of Gila and Pinal Counties in Arizona is currently classified as nonattainment for the 2010, 1-hour primary SO<sub>2</sub> NAAQS; 2008 lead NAAQS; and 1987 PM-10 NAAQS. Asarco is the only source of lead and SO<sub>2</sub> emissions in the Hayden nonattainment area. Emission reductions required under a CD with the EPA were designed to bring the Asarco facility into compliance with the NESHAP by December 2018. In addition, revisions to the state implementation plan (SIP) were intended to provide for attainment with the SO<sub>2</sub> and lead NAAQS by the attainment dates of October 2018 and October 2019, respectively. A review of 2019 monitoring data from four total suspended particulates (TSP) lead monitors and five particulate (PM-10) monitors in the area around Asarco that measure arsenic and other metals were compared to model results. The modeled concentrations predicted in the above analysis for Asarco were two to five times lower than the monitor concentrations. Refer to Table 2 for comparisons and the respective ambient air concentrations and risk values. Monitor 23 (4<sup>th</sup> Street and Hillcrest Avenue) was identified as the critical monitor due to its close proximity (within 100 meters) of the modeled MIR location for Asarco. Based upon the 2019 arsenic monitoring data from Monitor 23, excess cancer risks were equal to 90-in-1 million compared to a model-predicted monitor value of 50-in-1 million for Asarco. Monitor values also indicate a chronic noncancer HQ of 1 from arsenic.

The Miami area of Gila County, Arizona, was classified as nonattainment for the 2010, 1-hour primary SO<sub>2</sub> NAAQS in August 2013. Freeport is the only source of lead and SO<sub>2</sub> emissions in the Miami nonattainment area. Emission reductions required under a revision to the SIP were designed to provide for attainment of the SO<sub>2</sub> NAAQS by October 2018. The 2019 monitoring data from the lead NAAQS (TSP) monitor were compared to model results, with modeled concentrations being in close agreement to monitored concentrations. Refer to Table 2 for comparisons of the annual monitored concentrations. AQS Monitor (04-007-8000) is located at the Miami golf course (SR 188 and US 60) and is the only operating monitor for the area. This monitor is located approximately 1,400 meters southwest of the MIR location from the

HEM-4 model run. Based on the model analysis presented above, the monitor is located such that the maximum off-site modeled lead concentration may be up to a factor of four times higher than measured at the golf course site. Thus, based on the modeling analysis presented in this risk assessment, the predicted off-site ambient concentrations near the Freeport facility may approach or exceed the maximum lead 3-month average NAAQS of 0.15 ug/m<sup>3</sup>.

**Table 2. Monitor to Model Comparison for Primary Copper Smelting Source Category for Arsenic and Lead**

Site	Annual Average Conc. (ug/m <sup>3</sup> )		Cancer Risk (xx-in-1 million)		HQ	
	Model	Monitor	Model	Monitor	Model	Monitor
Asarco Monitor 23 (As) <sup>1, 2</sup>	0.011	0.022	50	90	0.8	1.4
Asarco Monitor 23 (Pb) <sup>1, 2</sup>	0.025	0.098	NA	NA	NA	NA
Freeport NAAQS Monitor (Pb) <sup>2</sup>	0.026	0.022	NA	NA	NA	NA

<sup>1</sup> The Asarco Monitor 23 is located off-site and within 100 meters of the modeled MIR residential location.

<sup>2</sup> The monitor and modeling data were based upon emission estimates and monitoring data collected for the 2019 calendar year.

With regard to emissions estimates used for the modeling analysis, as discussed in section II.C above, the Agency has higher confidence and less uncertainty with the Freeport emissions as compared to Asarco because the Agency has multiple test results for both point and non-point (*i.e.*, fugitive) sources of emissions for Freeport. However, for Asarco, the Agency only has test data for the point source emissions. The EPA has no test data for the non-point emissions. For Asarco, the non-point (fugitive) emissions estimates are based on emission factors and various calculations.

#### 7. How is baseline risk distributed across demographic groups?

To examine the potential for any environmental justice issues that might be associated with the source category, EPA performed a baseline demographic analysis to identify how risk is distributed among different demographic groups of the populations living within 5 km and within 50 km of the two major source facilities. The methodology and the results of the baseline demographic analysis are presented in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Source Category Operations*, which is available in the docket. This report is discussed in this section regarding estimated impacts under the existing standards (*i.e.*, baseline). In the analysis, we evaluated the distribution of HAP-related cancer and noncancer risks from the primary copper

smelting major source category across different demographic groups within the populations living near facilities.<sup>32</sup> With regard to the Kennecott area source facility, we note that Kennecott is located in a very remote area. The closest residence is estimated to be at least 3 miles from the smelting facility. Furthermore, as described in section III.C of this preamble, ambient monitoring for lead was conducted for about 7 years in the vicinity of Kennecott by Utah DAQ which demonstrated that the likelihood of violating the NAAQS for lead was so low, it would no longer be necessary to run the monitor. Therefore, we did not conduct a demographic analysis for Kennecott.

The results of the baseline demographic analyses, which reflect an average for the two major sources, are summarized in Table 3 below. These results, for various demographic groups, are based on the estimated risk from actual emissions levels for the population living within 50 km of the facilities.

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<sup>32</sup> Demographic groups included in the analysis are: White, African American, Native American, other races and multiracial, Hispanic or Latino, children 17 years of age and under, adults 18 to 64 years of age, adults 65 years of age and over, adults without a high school diploma, people living below the poverty level, people living two times the poverty level, and linguistically isolated people.

**Table 3. Primary Copper Smelting Source Category Baseline Demographic Risk Analysis Results**

	Nationwide <sup>1</sup>	Population with Cancer Risk at or Above 1-in-1 Million Due to Primary Copper Smelting <sup>2</sup>
Total Population	328,016,242	26,125
White and Minority by Percent		
White <sup>3</sup>	60	36
All Other Races	40	64
Minority by Percent		
African American	12	0.7
Native American	0.7	27
Hispanic or Latino (includes white and nonwhite)	19	33
Other and Multiracial	8	3
Income by Percent		
Below Poverty Level	13	27
Above Poverty Level	87	73
Education by Percent		
Over 25 and without High School Diploma	12	20
Over 25 and with a High School Diploma	88	80
Linguistically Isolated by Percent		
Linguistically Isolated	5	3

<sup>1</sup> The nationwide population is based on the Census' 2015-2019 American Community Survey five-year average and includes Puerto Rico.

<sup>2</sup> Demographics within HEM4 model domain (50km) of facilities in source category.

<sup>3</sup> We use the term White throughout as shorthand to refer to what Census calls White alone (i.e., single race) who are not Hispanic or Latino (i.e., NHA). Minority is used throughout to refer to the rest of the population (i.e., all but NHA). Minority is made up of four groups: African American is used here to refer to what Census calls "Black or African American alone," Native American here refers to what Census calls "American Indian and Alaska Native alone," Hispanic or Latino is the term as used by Census, and Other and Multiracial here refers to the remainder of the minority population.

The results of the primary copper smelting source category baseline demographic analysis indicate that emissions from the major source category expose approximately 26,125 people to a cancer risk at or above 1-in-1 million. No person is exposed to a chronic noncancer TOSHI greater than 1. As shown in Table 3, the average percentages of the at-risk population in the Native American, Hispanic, Below Poverty Level, and Over 25 without High School Diploma demographic groups are significantly greater than their respective nationwide percentages. Note, for one facility, Asarco, the baseline demographic analysis indicates that of the population with risks at or above 1-in-1 million, 73 percent are Hispanic, which is significantly greater than the nationwide percentage, 19 percent, as described further in the

demographic analysis technical report cited above. Thus, the elevated cancer risks associated with emissions from the major source category disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities.

With regard to acute noncancer risks, the acute screening analysis completed for this proposed rule is a conservative approach that applies health protective assumptions that every process releases its peak hourly emissions at the same hour, that the reasonable worst-case dispersion conditions occur at that same hour, and that an individual is present at the location of maximum HAP concentration for that hour. Estimating population risks or the number of individuals exposed to acute events that exceed the arsenic acute 1-hour REL would be problematic due to the nature of the screening assessment, especially for a specific hour in which this event would occur. Due to this uncertainty, we did not complete a demographics analysis for acute noncancer risks.

With regard to lead, the modeled exceedances of the lead NAAQS based on estimated actual emissions were estimated to occur only in a small area near Freeport and we did not have precise demographic information for that specific area. Therefore, we did not conduct a demographics analysis for lead.

Nevertheless, since the potential acute risks from arsenic emissions, and the highest estimated exposures due to lead emissions, are from the same facility and sources that drive the cancer risks for the source category, we expect that the demographic make-up of the exposed populations living near the facility (who could have potential acute risks and higher lead exposures due to these emissions) would be similar to the profiles presented in Table 3 above.

*C. What are our proposed decisions regarding risk acceptability, ample margin of safety, and adverse environmental effect?*

#### 1. Risk Acceptability

As explained in section III of this preamble, the EPA sets standards under CAA section 112(f)(2) using “a two-step standard-setting approach, with an analytical first step to determine

an 'acceptable risk' that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual risk (MIR) of approximately 1-in-10 thousand” (see 54 FR 38045, September 14, 1989). In this proposal, the EPA estimated risks based on actual and allowable emissions from the primary copper smelting major source category under the current NESHAP.

The estimated inhalation cancer risk to the individual most exposed to allowable emissions from the source category is 90-in-1 million. The estimated inhalation cancer risk to the individual most exposed to actual emissions from the source category is 80-in-1 million. The estimated incidence of cancer due to inhalation exposures is 0.003 excess cancer cases per year, or one excess case every 333 years. The estimated number of people to have cancer risk above 1-in-1 million from HAP allowed to be emitted from the facilities in this source category is 29,001.

Based on allowable lead emissions, the maximum 3-month off-site modeled concentration was estimated to be as high as 0.24 ug/m<sup>3</sup>, above the lead NAAQS of 0.15 ug/m<sup>3</sup>. Further, based on actual lead emissions, the maximum 3-month off-site modeled concentration was estimated to be 0.17 ug/m<sup>3</sup>, above the lead NAAQS of 0.15 ug/m<sup>3</sup>. The lead standard is based upon exposure through all pathways (inhalation and ingestion) with an adequate margin of safety to be protective of all sub-populations at risk, including and especially children. Lead concentrations above the NAAQS increase the risk of developmental effects for children. While the Agency examined the potential risk from lead exposure by comparing ambient levels directly to the NAAQS, the noncancer risks predicted for this category from arsenic are also associated with developmental effects. Thus, while the Agency did not combine the risk of developmental effects from exposure to lead with the hazard index associated with exposure to arsenic, the Agency would expect the combined exposures and hazards to be greater than each of the individual exposures and hazards presented above.

The multipathway risk assessment results indicated a maximum Tier 3 cancer risk of 1000-in-1 million based on the rural gardener scenario and a maximum Tier 3 noncancer HQ of 4 for the fisher scenario. Based upon past experience with site-specific assessments, the Agency would expect a minimum decrease by a factor of 50 for the above risks. Also, due to the arid climate of the area and the hypothetical nature/location of the garden, estimated upper-end ingestion rates for this scenario seem unlikely for this area. Further, the Agency estimated that the HQs for ingestion exposure, specifically for cadmium and mercury through fish ingestion, are less than 1.

The acute risk screening assessment of reasonable worst-case inhalation impacts indicates a maximum off-site acute HQ (REL) of 7, located at a residential location.

Considering all of the health risk information and factors discussed above, including the uncertainties discussed in section III of this preamble, the EPA proposes that the risks for this source category under the current MACT provisions are unacceptable. This proposed determination is largely based on the estimated exceedances of the lead NAAQS described above along with the maximum acute HQ of 7 for arsenic, which indicate there are significant risks of noncancer health effects for people near the facility. Also contributing to this proposed determination, although to a lesser extent, are the inhalation cancer MIRs due to arsenic, with an estimated MIR of 80-in-1 million for actual emissions and 90-in-1 million for allowable emissions, which are approaching the presumptive level of unacceptability of 100-in-1 million (described above in this preamble).

## 2. Proposed Controls to Address Unacceptable Risk

As discussed in section IV.C.1 above, the Agency is proposing that baseline risks (actual emissions) are unacceptable. The largest contributors to these unacceptable risks are the metal HAP (mainly lead and arsenic) emissions from the anode refining process fugitive emissions roof vents at Freeport, which constitute about 71 percent of the MIR. As described in section IV.A above, under the section 112(d)(2)/(d)(3) of the CAA, the Agency is proposing BTF



emissions limits for PM, as a surrogate for metal HAP, for the anode refining process fugitive emissions roof vents, which the Agency estimates will reduce HAP metal emissions from this source by about 90 percent at Freeport. The EPA evaluated whether these reductions will further reduce cancer risks and noncancer hazards to an acceptable level by conducting a “post-control” risk assessment to estimate what the risks will be after implementation of the BTF PM emissions limit. Based on that analysis, the Agency estimates the inhalation cancer MIR will be reduced from 80-in-1 million to 30-in-1 million at Freeport with 20,566 people exposed to a cancer risk greater than or equal to 1-in-1 million, a 21 percent reduction when compared to cancer risk from actual emissions. The chronic noncancer HI will remain well below 1 and the maximum off-site acute HQ based on the 1-hour REL will be reduced from 7 to 2. Further, the maximum 3-month lead ambient concentration will be reduced below the NAAQS from 0.17  $\mu\text{g}/\text{m}^3$  to 0.073  $\mu\text{g}/\text{m}^3$ . However, the modeled cancer MIR for the source category would be 60-in-1 million, since the EPA expects the BTF limit will achieve no reductions from Asarco. Based on these results, the Agency is proposing that the emissions reductions that will be achieved by the BTF emissions limit for PM for anode refining process fugitive roof vents (described in section IV.A above) will be sufficient to achieve acceptable risks.

Therefore, to reduce risks to a level that would be considered acceptable, under section 112(f) of the CAA, the Agency is proposing the exact same emissions limit for anode refining roof vents that the Agency is proposing as a BTF limit for the roof vents in buildings housing anode refining under CAA section 112(d)(2) and (d)(3) (which is described in more detail above in section IV.A.2). This is expected to require additional capture and control systems to reduce process fugitive emissions at the Freeport facility. The estimated emissions at Asarco are considerably lower than at Freeport. Asarco is not expected to have to install additional capture and control systems to comply with the proposed limits for anode refining roof vents, although they would incur costs for emissions testing. For anode refining roof vents, under section 112(f)(2) of the CAA, the Agency is proposing the following risk-based emission limits:

- For existing and new anode refining operations located at primary copper smelting facilities, the Agency is proposing an emissions limit for PM of 1.6 lbs/hr for anode refining roof vents.

With regard to demographic impacts, due to the fact that the EPA is proposing that risks from emissions of air toxics from this major source category are unacceptable at baseline and since EPA is proposing new standards (as described above) which are expected to reduce risks to an acceptable level, EPA performed a post-control demographic analysis to identify how the estimated risks would be distributed among different demographic groups of the populations living within 5 km and within 50 km of the two major source facilities after the additional controls (described above) are in place. The methodology and the results of the post-control demographic analysis are presented in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*, which is available in the docket.

This post-control demographic report indicates that for the major source category as a whole, average cancer risk for demographic groups would decrease as follows as a result of additional capture and control systems at the Freeport facility: Hispanic or Latino (4-in-1 million to 3-in-1 million); Native American (2-in-1 million to 1-in-1 million); African American (10-in-1 million to 5-in-1 million); Other and Multiracial (5-in-1 million to 3-in-1 million); people living below the poverty level (4-in-1 million to 2-in-1 million); people 25 years old and older without a high school diploma (4-in-1 million to 2-in-1 million); and people living in linguistic isolation (4-in-1 million to 2-in-1 million). For the total population exposed to emissions from the source category, average cancer risk would be reduced from 4-in-1 million to 2-in-1 million.

### 3. Ample Margin of Safety Analysis.

After identifying controls that would reduce risk to an acceptable level, the Agency next considered whether additional measures are required to provide an ample margin of safety to protect public health. In the ample margin of safety analysis, the Agency evaluated the cost and

feasibility of available control technologies and other measures (such as work practices) that could be applied to the source category to further reduce the risk due to emissions of HAP.

With regard to additional controls considered under the ample margin of safety analysis, as described in section IV.B.1, another emission point contributing significantly to risks at Freeport is the Aisle Scrubber, which is used to control the combination of secondary emissions from the converter plus the emissions exiting the baghouse used to control primary anode refining point source emissions. Therefore, the Agency estimated the costs to install an additional PM control device (*e.g.*, a wet ESP) and the emissions and risks reductions that would be achieved. Based on that analysis, we estimate these controls would have capital costs of \$50M and annualized costs of \$13M and achieve about 7.6 tpy of metal HAP with cost effectiveness of \$1.7M per ton of metal HAP. Based on risk modeling, the Agency estimates the addition of these controls (in addition to the controls for anode roof vent process fugitives described above) would reduce the maximum 3-month ambient lead concentration near Freeport from 0.073 ug/m<sup>3</sup> to 0.024 ug/m<sup>3</sup>, the inhalation cancer MIR near Freeport would be reduced from 30 to 20-in-1 million, with 17,350 people exposed to a cancer risk greater than or equal to 1-in-1 million, a 34 percent reduction when compared to cancer risk from actual emissions. The maximum off-site acute HQ would remain the same with an HQ = 2. The additional control options changed the maximum acute off-site location, resulting in a lower potential for exposure. The acute arsenic HQ is based upon an REL, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for repeated exposures; however, the level of exposure that would cause health effects is not specifically known. As the exposure concentration increases above the acute REL, the potential for effects increases. Based upon an acute HQ value of 2 for arsenic emissions based on the REL, and given the protective nature of the REL (as described previously in this preamble, in section III.C.3.c) and without any additional acute health benchmarks to apply to further characterize the potential for severe or

reversible effects it is reasonable to assume that acute health risks from arsenic for this source category would be low.

Given the relatively high estimated capital costs, uncertainties, and moderate risk reductions that would be achieved for populations living near these facilities, the Agency is not proposing these additional controls for the Aisle Scrubber at this time. Nevertheless, the Agency is soliciting comments regarding our analysis (including the costs, costs effectiveness, and risk reductions) and whether the EPA should establish more stringent standards to reduce HAP metal emissions from the Aisle Scrubber.

The EPA also evaluated an option to reduce risks from the Asarco facility. In this case the Agency evaluated the potential to reduce process fugitive HAP metal emissions from the flash smelting furnace roof vents by installing hoods, ducts, fans, and an additional baghouse. Under this option, the Agency estimated capital costs of \$19,107,200, annualized costs of \$4,244,610, and approximately 1.08 tpy reduction of HAP metals, with cost effectiveness of \$3,537,000 per ton of HAP metals. These controls would reduce the modeled inhalation cancer risk for Asarco (primarily due to arsenic emissions) from 60-in-1 million to about 10-in-1 million. These controls would also reduce lead emissions and associated risk from lead exposures from Asarco to some extent. However, given the relatively high estimated capital costs, annualized costs, poor cost effectiveness, uncertainties, and limited risk reductions that would be achieved for populations living near these facilities, we are not proposing these additional controls for the flash smelting furnace at Asarco at this time. Nevertheless, we are soliciting comments regarding our analysis (including the costs, cost effectiveness, and risk reductions) and whether the EPA should establish more stringent standards to reduce HAP metal emissions from the Flash Furnace at Asarco.

In addition to the controls described above, the Agency also evaluated the potential to propose additional work practices to reduce fugitive dust emissions, consistent with Asarco's

current consent decree. The additional work practices the Agency identified include the following:

- Routine cleaning of paved roads with a sweeper, vacuum or wet broom (in accordance with applicable recommendations by the manufacturer of the street sweeper, vacuum, or wet broom), with such cleaning to occur no less frequently than on a daily basis unless the roads have sufficient surface moisture such that fugitive dust is not generated.
- Chemical dust suppressants will be applied not less frequently than once per month at slag haul roads and not less frequently than every 6 weeks on all other unpaved roads unless the roads have sufficient surface moisture such that fugitive dust is not generated.
- Copper concentrate storage, handling, and unloading operations.
- The cargo compartment of all trucks or other motor vehicles (*e.g.*, front-end loaders) when transporting bulk quantities of fugitive dust materials must be maintained to ensure:
  - (i) The floor, sides, and/or tailgate(s) are free of holes or other openings.
  - (ii) All loads of trucks containing copper concentrate arriving at the facility are covered with a tarp to prevent spills and fugitive emissions.
  - (iii) Trucks are loaded only to such a level as to prevent spillage over the side.
  - (iv) A speed limit of 15 mph is required.
  - (v) All dust producing material internally transferred or moved by truck at the facility is covered with a tarp to prevent spills and fugitive emissions.
- Revert crushing operations and crushed revert storage.
- Scrubber liquid blowdown drying operations.
- Other site-specific sources of fugitive dust emissions that the Administrator or delegated permitting authority designate to be included in your fugitive dust control plan.
- For any element of the fugitive dust control plan that requires new construction at the facility, the owner or operator shall complete such construction, in accordance with the specifications and schedule set forth in the approved fugitive dust control plan.

- The fugitive dust control plan must be reviewed, updated (if necessary), and then approved by the permitting authority with each application for the Title V operating permit renewal pursuant to part 70 or part 71 of this chapter and with each permit application for the construction or modification of lead-bearing fugitive dust generating sources.

Since the facilities already need to implement most of these work practices per the consent decrees or state air permits, we expect there will be very minimal additional costs if these work practices are also incorporated into the NESHAP. The only additional costs would be a slight increase related to recordkeeping and reporting requirements. Furthermore, the Agency concludes that these additional work practices will achieve unquantified reductions of fugitive dust HAP metal emissions and associated human health risks. Therefore, under CAA section 112(f), as part of our ample margin of safety determination, the Agency is proposing that the facilities will need to develop and implement a more robust fugitive dust plan than currently required by the NESHAP. This plan would require, at a minimum, the specific work practices described above, but also could include other practices identified by the facilities (or the permitting authority to minimize these fugitive dust emissions).

Finally, EPA considered the impact of the proposed standards on the distribution of post-control risks as outlined in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*. The baseline risk analysis indicated the potential for elevated cancer risks associated with emissions from the major source category to disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities. EPA also noted that the potential acute risks from arsenic emissions, and the highest estimated exposures due to lead emissions, are associated with the Freeport facility. The post-control analysis indicated that with the addition of controls proposed in this rulemaking, the cancer risks will be reduced from an estimated

maximum individual excess cancer risk at Freeport from 80-in-1 million to 30-in-1 million, and noncancer risks will also be reduced significantly, substantially reducing risk among highly exposed individuals and reducing some of the risk disparities identified in the baseline (pre-control) scenario. Furthermore, the maximum modeled excess cancer risk for any person near Asarco is 60-in-1 million. As a result, EPA concludes that the proposed standards provide an ample margin of safety to protect public health and notes that for the major source category as a whole, average cancer risk for each demographic group will be reduced.

In summary, based on our ample margin of safety analysis, we are not proposing additional controls for the combined emissions stream from the anode refining furnace and secondary converter operations or the flash furnaces, as described above. Furthermore, the Agency did not identify any additional controls or measures to further reduce process fugitive emissions from the anode refining roof vents beyond those controls being proposed under the acceptability section (described above). However, the Agency is proposing additional work practices to limit fugitive dust emissions as part of the ample margin of safety analysis. Overall, the Agency proposes that with the additional controls for the anode refining furnace process fugitive roof vents described above (under the acceptability section), and the additional fugitive dust work practice standards being proposed based on our ample margin of safety analysis, the NESHAP will provide an ample margin of safety to protect public health. The acute arsenic HQ of 2 is based upon an REL, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for repeated exposures; however, the level of exposure that would cause health effects is not specifically known. As the exposure concentration increases above the acute REL, the potential for effects increases. Based upon an acute HQ value of 2 for arsenic emissions, without any additional acute health benchmarks to apply to further characterize the potential for severe or reversible effects it is reasonable to assume that acute health risks from arsenic for this source category would be low.

#### 4. Adverse Environmental Effect

Based on the results of the environmental risk screening analysis, the Agency does not expect an adverse environmental effect as a result of HAP emissions from this source category.

*D. What are the results and proposed decisions based on our technology review?*

Under the technology review, the EPA searched, reviewed, and considered several sources of information to determine whether there have been developments in practices, processes, and control technologies as required by section 112(d)(6) of the CAA. The EPA researched practices, processes, and control technologies through a literature review to identify advancements in processes and control technologies in the primary copper smelting industry with a view toward identifying “developments” in practices, processes, and control. In conducting the technology review, the Agency examined information in the RBLC to identify technologies in use and determine whether there have been relevant developments in practices, processes, or control technologies. The RBLC is a database that contains case-specific information on air pollution technologies that have been required to reduce the emissions of air pollutants from stationary sources. Potential developments in the industry were discussed with representatives of the primary copper smelting companies. In addition, state permits as well as recent consent decrees or consent orders between the EPA or the ADEQ and primary copper smelters were reviewed to assess control technologies at primary copper smelting plants. To identify developments, the Agency evaluated whether there were improvements in processes and control technologies available at the time the standards were promulgated that could reduce emissions of the regulated pollutants. We also evaluated whether there were processes and control technologies that were not available at the time the standards were promulgated that could reduce emissions of the regulated pollutants.

Concentrate dryers are used at the Kennecott Utah facility and the Asarco Hayden plant. The Freeport-McMoRan Miami smelter uses a wet feed and has no dryer. PM control at the Kennecott dryer consists of a baghouse and a scrubber. PM emissions from the Asarco dryers are controlled using baghouses.



Smelting furnaces at Asarco are controlled by a venturi scrubber followed by a wet gas cleaning system and an acid plant. Process gases from the Kennecott smelting furnace are exhausted to a waste heat boiler and then to an ESP, a wet scrubber, and a wet ESP. The off-gas from the Freeport smelting furnace is routed through a waste heat boiler where entrained dust settles out and is then routed to an ESP.

Matte drying and grinding are performed at the Asarco and Freeport facilities. Emissions are controlled using baghouses.

The two major sources, Asarco and Freeport, use batch converters. Controls include combinations of baghouses, scrubbers, and ESPs. Process gases at the Kennecott continuous converter are exhausted to a waste heat boiler, an ESP, a wet scrubber, and then to a wet ESP.

Slag cleaning emissions at Kennecott are vented to scrubbers. The slag cleaning furnace at Asarco has been decommissioned and the slag is allowed to cool and is sent back for additional processing for additional copper recovery. At the Freeport facility, the slag is sent to an electric furnace, and off-gas from the furnace is cooled with water sprays and then ducted to the acid plant.

Exhaust gases from anode refining furnaces are controlled by baghouses. Secondary gas systems typically exhaust to either a baghouse, a baghouse and a scrubber, or a scrubber and wet ESP.

All three primary copper smelting facilities operate under a fugitive dust control plan. Controls include the use of water sprays, chemical dust suppressants, placing material stockpiles below grade, and installing wind screens or wind fences around the source.

#### 1. 40 CFR Part 63, Subpart QQQ

The current NESHAP for major source primary copper smelting facilities (40 CFR part 63, subpart QQQ) establishes numeric emission limits for PM, a surrogate for metal HAP, for copper concentrate dryers, smelting furnaces, slag cleaning vessels, and existing copper converters. The standard for new converters prohibits batch converters. An opacity limit applies

to the converter building during performance testing. A fugitive dust control plan is required for the control of fugitive emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with all applicable emission limitations, work practice standards, and operation and maintenance requirements in this subpart. The requirements apply to primary copper smelters that are (or are part of) a major source of HAP emissions and that use batch copper converters.

As part of the technology review for the major source category, the Agency identified previously unregulated processes and pollutants, and are regulating them under CAA section 112(d)(2) and (3), as described in section IV.A, above; these new provisions also are being proposed under CAA section 112(f)(2), as described in section IV.C, above. With regard to the emissions sources at major primary copper smelting facilities, including sources of fugitive dust emissions, the Agency did not identify any developments in practices, processes, or control technologies beyond those described under the ample margin of safety analysis above.

## 2. 40 CFR Part 63, Subpart EEEEEEE

The current NESHAP for area source primary copper smelting facility (40 CFR part 63, subpart EEEEEEE) establishes numeric emission limits for PM (a surrogate for metal HAP), emitted from copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plants, secondary gas systems, and anode refining departments. This subpart also requires work practices to ensure the capture of gases and fumes from the transfer of molten materials and their conveyance to control devices, provisions to monitor PM emissions for initial and continuous compliance, work practice standards, and operation and maintenance. With regard to the emissions sources at the area source primary copper smelting facility, including sources of fugitive dust emissions, the Agency did not identify any developments in practices, processes, or control technologies.

For more details, refer to the document, *Technology Review for the Primary Copper Smelting Source Category*, which is available in Docket ID No. EPA-HQ-OAR-2020-0430.

#### *E. What other actions are we proposing?*

In addition to the proposed actions described above, the EPA is proposing additional revisions to the NESHAP. The EPA is proposing revisions to the SSM provisions of the MACT rule in order to ensure that they are consistent with the decision in *Sierra Club v. EPA*, 551 F. 3d 1019 (D.C. Cir. 2008), in which the court vacated two provisions that exempted sources from the requirement to comply with otherwise applicable CAA section 112(d) emission standards during periods of SSM. The Agency is proposing various other changes to the NESHAP, including the following: (1) require electronic reporting of performance test results and notification of compliance reports; (2) revising the applicability under section 63.1441 to clarify that the NESHAP applies to major source smelting facilities that use any type of converter, not just batch converters; (3) revising the testing requirements under section 63.1450 to clarify that facilities must test for filterable particulate, not total particulate, (4) adding test methods for mercury, PM10 and fugitive PM and updating test methods that are incorporated by reference; and (5) revising the definitions under section 63.1459 by changing the term “smelting furnace” to “smelting vessel” to be consistent with the definition in the area source rule, subpart EEEEE. Our analyses and proposed changes related to these issues are discussed below.

##### 1. SSM

In its 2008 decision in *Sierra Club v. EPA*, 551 F.3d 1019 (D.C. Cir. 2008), the court vacated portions of two provisions in the EPA’s CAA section 112 regulations governing the emissions of HAP during periods of SSM. Specifically, the court vacated the SSM exemption contained in 40 CFR 63.6(f)(1) and 40 CFR 63.6(h)(1), holding that under section 302(k) of the CAA, emissions standards or limitations must be continuous in nature and that the SSM exemption violates the CAA's requirement that some section 112 standards apply continuously.

The EPA is proposing the elimination of the SSM exemptions in these rules. Consistent with *Sierra Club v. EPA*, the Agency is proposing standards in these rules that apply at all times. The Agency is also proposing several revisions to Table 1 to subpart QQQ and Table 1 to

subpart EEEEEEE (the General Provisions Applicability Tables) as is explained in more detail below. For example, the Agency is proposing to eliminate the incorporation of the General Provisions' requirement that the source develop an SSM plan. The EPA is also proposing to eliminate and revise certain recordkeeping and reporting requirements related to the SSM exemption as further described below.

The EPA has attempted to ensure that the provisions the Agency is proposing to eliminate are inappropriate, unnecessary, or redundant in the absence of the SSM exemption. The EPA specifically is seeking comments on whether the Agency has successfully done so.

In proposing the standards in these rules, the EPA has considered startup and shutdown periods and, for the reasons explained below, is not proposing alternative standards for those periods. The associated control devices are operational before startup and during shutdown of the affected sources at primary copper smelting facilities. Therefore, we expect that emissions during startup and shutdown would be no higher than emissions during normal operations. We know of no reason why the existing standards should not apply at all times.

Periods of startup, normal operations, and shutdown are all predictable and routine aspects of a source's operations. Malfunctions, in contrast, are neither predictable nor routine. Instead they are, by definition, sudden, infrequent, and not reasonably preventable failures of emissions control, process, or monitoring equipment. (40 CFR 63.2) (Definition of malfunction). The EPA interprets CAA section 112 as not requiring emissions that occur during periods of malfunction to be factored into development of CAA section 112 standards and this reading has been upheld as reasonable by the court in *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 606-610 (2016). Under CAA section 112, emissions standards for new sources must be no less stringent than the level "achieved" by the best controlled similar source and for existing sources generally must be no less stringent than the average emission limitation "achieved" by the best performing 12 percent of sources in the category. There is nothing in CAA section 112 that directs the Agency to consider malfunctions in determining the level "achieved" by the best performing

sources when setting emission standards. As the court has recognized, the phrase “average emissions limitation achieved by the best performing 12 percent of” sources “says nothing about how the performance of the best units is to be calculated.” *Nat'l Ass'n of Clean Water Agencies v. EPA*, 734 F.3d 1115, 1141 (D.C. Cir. 2013). While the EPA accounts for variability in setting emissions standards, nothing in CAA section 112 requires the Agency to consider malfunctions as part of that analysis. The EPA is not required to treat a malfunction in the same manner as the type of variation in performance that occurs during routine operations of a source. A malfunction is a failure of the source to perform in a “normal or usual manner” and no statutory language compels the EPA to consider such events in setting CAA section 112 standards.

Similarly, although standards for area sources are not required to be set based on “best performers,” the EPA is not required to consider malfunctions in determining what is “generally available.”

As the court recognized in *U.S. Sugar Corp.*, accounting for malfunctions in setting standards would be difficult, if not impossible, given the myriad different types of malfunctions that can occur across all sources in the category and given the difficulties associated with predicting or accounting for the frequency, degree, and duration of various malfunctions that might occur. *Id.* at 608 (“the EPA would have to conceive of a standard that could apply equally to the wide range of possible boiler malfunctions, ranging from an explosion to minor mechanical defects. Any possible standard is likely to be hopelessly generic to govern such a wide array of circumstances.”). As such, the performance of units that are malfunctioning is not “reasonably” foreseeable. See, e.g., *Sierra Club v. EPA*, 167 F.3d 658, 662 (D.C. Cir. 1999) (“The EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem. The EPA generally defers to an agency's decision to proceed on the basis of imperfect scientific information, rather than to 'invest the resources to conduct the perfect study.'”). See also, *Weyerhaeuser v Costle*, 590 F.2d 1011, 1058 (D.C. Cir. 1978) (“In the nature of things, no general limit, individual permit, or even any upset provision can anticipate all upset

situations. After a certain point, the transgression of regulatory limits caused by ‘uncontrollable acts of third parties,’ such as strikes, sabotage, operator intoxication or insanity, and a variety of other eventualities, must be a matter for the administrative exercise of case-by-case enforcement discretion, not for specification in advance by regulation.”). In addition, emissions during a malfunction event can be significantly higher than emissions at any other time of source operation. For example, if an air pollution control device with 99 percent removal goes off-line as a result of a malfunction (as might happen if, for example, the bags in a baghouse catch fire) and the emission unit is a steady state type unit that would take days to shut down, the source would go from 99 percent control to zero control until the control device was repaired. The source’s emissions during the malfunction would be 100 times higher than during normal operations. As such, the emissions over a 4-day malfunction period would exceed the annual emissions of the source during normal operations. As this example illustrates, accounting for malfunctions could lead to standards that are not reflective of (and significantly less stringent than) levels that are achieved by a well-performing non-malfunctioning source. It is reasonable to interpret CAA section 112 to avoid such a result. The EPA’s approach to malfunctions is consistent with CAA section 112 and is a reasonable interpretation of the statute.

Although no statutory language compels the EPA to set standards for malfunctions, the EPA has the discretion to do so where feasible. For example, in the Petroleum Refinery Sector Risk and Technology Review, the EPA established a work practice standard for unique types of malfunction that result in releases from pressure relief devices (PRDs) or emergency flaring events because the EPA had information to determine that such work practices reflected the level of control that applies to the best performers. 80 Fed. Reg. 75178, 75211-14 (Dec. 1, 2015). The EPA will consider whether circumstances warrant setting standards for a particular type of malfunction and, if so, whether the EPA has sufficient information to identify the relevant best performing sources and establish a standard for such malfunctions. The Agency also encourages commenters to provide any such information.

Based on the EPA's knowledge of the processes and engineering judgment, malfunctions in the Primary Copper Smelting source category are considered unlikely to result in a violation of the standard. Affected sources at primary copper smelting plants are controlled with add-on air pollution control devices which will continue to function in the event of a process upset. Also, processes in the industry are typically equipped with controls that will not allow startup of the emission source until the associated control device is operating and will shut down the emission source if the associated controls malfunction. Furnaces used in primary copper smelting, which are the largest sources of HAP emissions, typically operate continuously for long periods of time with no significant spikes in emissions. These minimal fluctuations in emissions are controlled by the existing add-on air pollution control devices used at all plants in the industry.

In the unlikely event that a source fails to comply with the applicable CAA section 112(d) standards as a result of a malfunction event, the EPA would determine an appropriate response based on, among other things, the good faith efforts of the source to minimize emissions during malfunction periods, including preventative and corrective actions, as well as root cause analyses to ascertain and rectify excess emissions. The EPA would also consider whether the source's failure to comply with the CAA section 112(d) standard was, in fact, sudden, infrequent, not reasonably preventable, and was not instead caused, in part, by poor maintenance or careless operation. 40 CFR 63.2 (Definition of malfunction).

If the EPA determines in a particular case that an enforcement action against a source for violation of an emission standard is warranted, the source can raise any and all defenses in that enforcement action and the federal district court will determine what, if any, relief is appropriate. The same is true for citizen enforcement actions. Similarly, the presiding officer in an administrative proceeding can consider any defense raised and determine whether administrative penalties are appropriate.

In summary, the EPA interpretation of the CAA, particularly section 112, is reasonable and encourages practices that will avoid malfunctions. Administrative and judicial procedures for

addressing exceedances of the standards fully recognize that violations may occur despite good faith efforts to comply and can accommodate those situations. *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 606-610 (2016).

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.6(e)(1)(i) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.6(e)(1)(i) describes the general duty to minimize emissions. Some of the language in that section is no longer necessary or appropriate in light of the elimination of the SSM exemption. The Agency is proposing instead to add general duty regulatory text at 40 CFR 63.1447(a) (subpart QQQ) that reflects the general duty to minimize emissions while eliminating the reference to periods covered by an SSM exemption. The general duty to minimize emissions at existing area sources (subpart EEEEE), including periods of SSM, are contained in sections 63.11147(c) and 63.11148(f). The general duty to minimize emissions at new sources are being proposed in 63.11149(c)(3). The current language in 40 CFR 63.6(e)(1)(i) characterizes what the general duty entails during periods of SSM. With the elimination of the SSM exemption, there is no need to differentiate between normal operations, startup and shutdown, and malfunction events in describing the general duty. Therefore, the language the EPA is proposing for subpart QQQ and subpart EEEEE do not include that language from 40 CFR 63.6(e)(1).

The EPA is also proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.6(e)(1)(ii) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.6(e)(1)(ii) imposes requirements that are not necessary with the elimination of the SSM exemption or are redundant with the general duty requirement being added at 40 CFR 63.1447(a) (subpart QQQ) and that are already required for existing sources in 40 CFR 63.11147(c) and 63.11148(f) and are proposed for new sources in 63.11149(c)(3).



The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.6(e)(3) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Generally, these paragraphs require development of an SSM plan and specify SSM recordkeeping and reporting requirements related to the SSM plan. As noted, the EPA is proposing to remove the SSM exemptions. Therefore, affected units will be subject to an emission standard during such events. The applicability of a standard during such events will ensure that sources have ample incentive to plan for and achieve compliance and, thus, the SSM plan requirements are no longer necessary.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.6(f)(1) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” The current language of 40 CFR 63.6(f)(1) exempts sources from non-opacity standards during periods of SSM. As discussed above, the court in *Sierra Club v. EPA* vacated the exemptions contained in this provision and held that the CAA requires that some CAA section 112 standards apply continuously. Consistent with *Sierra Club v. EPA*, the EPA is proposing to revise standards in these rules to apply at all times.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart EEEEE) entry for 40 CFR 63.6(h)(1) by changing the “yes” in the column titled “Applies to Subpart EEEEE” to a “no.” The entry for 40 CFR 63.6(h) in Table 1 to subpart QQQ is already a “no.” The current language of 40 CFR 63.6(h)(1) exempts sources from opacity standards during periods of SSM. As discussed above, the court in *Sierra Club* vacated the exemptions contained in this provision and held that the CAA requires that some CAA section 112 standard apply continuously. Consistent with *Sierra Club*, the EPA is proposing to revise standards in this rule to apply at all times.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.7(e)(1) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.7(e)(1) describes performance testing requirements. The EPA is instead proposing to add a performance testing requirement at 40 CFR 63.1450(a) and (b) (subpart QQQ) and 63.11148(e)(3) (subpart EEEEE). The performance testing requirements the Agency is proposing to add differ from the General Provisions performance testing provisions in several respects. The regulatory text does not include the language in 40 CFR 63.7(e)(1) that restated the SSM exemption and language that precluded startup and shutdown periods from being considered “representative” for purposes of performance testing. As in 40 CFR 63.7(e)(1), performance tests conducted under this subpart should not be conducted during malfunctions because conditions during malfunctions are often not representative of normal operating conditions. The EPA is proposing to add language that requires the owner or operator to record the process information that is necessary to document operating conditions during the test and include in such record an explanation to support that such conditions represent normal operation. Section 63.7(e) requires that the owner or operator make such records “as may be necessary to determine the condition of the performance test” available to the Administrator upon request but does not specifically require the information to be recorded. The regulatory text the EPA is proposing to add to these provisions builds on that requirement and makes explicit the requirement to record the information.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.8(c)(1)(i) and (iii) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” The cross-references to the general duty and SSM plan requirements in those subparagraphs are not necessary in light of other requirements of 40 CFR 63.8 that require

good air pollution control practices (40 CFR 63.8(c)(1)) and that set out the requirements of a quality control program for monitoring equipment (40 CFR 63.8(d)).

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.8(d)(3) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” The final sentence in 40 CFR 63.8(d)(3) refers to the General Provisions’ SSM plan requirement which is no longer applicable. The EPA is proposing to add to the rules at 40 CFR 63.1456(a)(4)(iii) in subpart QQQ and 63.11149(b)(3) in subpart EEEEE text that is identical to 40 CFR 63.8(d)(3) except that the final sentence is replaced with the following sentence: “The program of corrective action should be included in the plan required under §63.8(d)(2).”

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(b)(2)(i) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.10(b)(2)(i) describes the recordkeeping requirements during startup and shutdown. These recording provisions are no longer necessary because the EPA is proposing that recordkeeping and reporting applicable to normal operations will apply to startup and shutdown. In the absence of special provisions applicable to startup and shutdown, such as a startup and shutdown plan, there is no reason to retain additional recordkeeping for startup and shutdown periods.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(b)(2)(ii) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.10(b)(2)(ii) describes the recordkeeping requirements during a malfunction. The EPA is proposing to add such requirements to 40 CFR 63.1456 (subpart QQQ) and 40 CFR 63.11149(g) (subpart EEEEE). The regulatory text the Agency is proposing to add differs from the General Provisions it is replacing in that the General Provisions requires the creation and

retention of a record of the occurrence and duration of each malfunction of process, air pollution control, and monitoring equipment. The EPA is proposing that this requirement apply to any failure to meet an applicable standard and is requiring that the source record the date, time, and duration of the failure rather than the “occurrence.” The EPA is also proposing to add a requirement that sources keep records that include a list of the affected source or equipment and actions taken to minimize emissions, an estimate of the quantity of each regulated pollutant emitted over the standard for which the source failed to meet the standard, and a description of the method used to estimate the emissions. Examples of such methods would include product-loss calculations, mass balance calculations, measurements when available, or engineering judgment based on known process parameters. The EPA is proposing to require that sources keep records of this information to ensure that there is adequate information to allow the EPA to determine the severity of any failure to meet a standard, and to provide data that may document how the source met the general duty to minimize emissions when the source has failed to meet an applicable standard.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(b)(2)(iv) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” When applicable, the provision requires sources to record actions taken during SSM events when actions were inconsistent with their SSM plan. The requirement is no longer appropriate because SSM plans will no longer be required. The requirement previously applicable under 40 CFR 63.10(b)(2)(iv)(B) to record actions to minimize emissions and record corrective actions is now applicable by reference to 40 CFR 63.1456 (subpart QQQ) and 40 CFR 63.11149.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(b)(2)(v) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE”

to a “no.” When applicable, the provision requires sources to record actions taken during SSM events to show that actions taken were consistent with their SSM plan. The requirement is no longer appropriate because SSM plans will no longer be required.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(c)(15) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” The EPA is proposing that 40 CFR 63.10(c)(15) no longer apply. When applicable, the provision allows an owner or operator to use the affected source's SSM plan or records kept to satisfy the recordkeeping requirements of the SSM plan, specified in 40 CFR 63.6(e), to also satisfy the requirements of 40 CFR 63.10(c)(10) through (12). The EPA is proposing to eliminate this requirement because SSM plans would no longer be required, and therefore 40 CFR 63.10(c)(15) no longer serves any useful purpose for affected units.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEE) entry for 40 CFR 63.10(d)(5) by changing the “yes” in the column titled “Applies to Subpart QQQ” and in the column titled “Applies to Subpart EEEEE” to a “no.” Section 63.10(d)(5) describes the reporting requirements for SSM. To replace the General Provisions reporting requirement, the EPA is proposing to add reporting requirements to 40 CFR 63.1455 (subpart QQQ) and 40 CFR 63.11147, 63.11148, and 63.11149 (subpart EEEEE). The replacement language differs from the General Provisions requirement in that it eliminates periodic SSM reports as a stand-alone report. The Agency is proposing language that requires sources that fail to meet an applicable standard at any time to report the information concerning such events in the semi-annual or other reporting period deviation or excess emission report already required under these rules. The Agency is proposing that the report must contain the number, date, time, duration, and the cause of such events (including unknown cause, if applicable), a list of the affected sources or equipment, an estimate of the quantity of each

regulated pollutant emitted over any emission limit, and a description of the method used to estimate the emissions.

Examples of such methods would include product-loss calculations, mass balance calculations, measurements when available, or engineering judgment based on known process parameters. The EPA is proposing this requirement to ensure that there is adequate information to determine compliance, to allow the EPA to determine the severity of the failure to meet an applicable standard, and to provide data that may document how the source met the general duty to minimize emissions during a failure to meet an applicable standard.

The EPA will no longer require owners or operators to determine whether actions taken to correct a malfunction are consistent with an SSM plan, because plans would no longer be required. The proposed amendments therefore eliminate any cross reference to 40 CFR 63.10(d)(5)(i) that contains the description of the previously required SSM report format and submittal schedule from this section. These specifications are no longer necessary because the events will be reported in otherwise required reports with similar format and submittal requirements.

## 2. Electronic Reporting

The EPA is proposing that owners and operators of Primary Copper Smelting facilities submit electronic copies of required performance test reports, through the EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI). A description of the electronic data submission process is provided in the memorandum *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, available in the docket for this action. The proposed rule requires that performance test results collected using test methods that are supported by the EPA's Electronic Reporting Tool (ERT) as listed on the ERT website at the time of the test be submitted in the format generated through the use of the ERT or an electronic file consistent with the xml schema on the ERT website, and other performance test results be

submitted in portable document format (PDF) using the attachment module of the ERT. Similarly, performance evaluation results of continuous emissions monitoring systems (CEMS) measuring relative accuracy test audit (RATA) pollutants that are supported by the ERT at the time of the test must be submitted in the format generated through the use of the ERT or an electronic file consistent with the xml schema on the ERT website, and other performance evaluation results be submitted in PDF using the attachment module of the ERT.

Additionally, the EPA has identified two broad circumstances in which electronic reporting extensions may be provided. These circumstances are (1) outages of the EPA's CDX or CEDRI, which preclude an owner or operator from accessing the system and submitting required reports, and (2) force majeure events, which are defined as events that will be or have been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevent an owner or operator from complying with the requirement to submit a report electronically. Examples of force majeure events are acts of nature, acts of war or terrorism, or equipment failure or safety hazards beyond the control of the facility. The EPA is providing these potential extensions to protect owners and operators from noncompliance in cases where they cannot successfully submit a report by the reporting deadline for reasons outside of their control. In both circumstances, the decision to accept the claim of needing additional time to report is within the discretion of the Administrator, and reporting should occur as soon as possible.

The electronic submittal of the reports addressed in this proposed rulemaking will increase the usefulness of the data contained in those reports, is in keeping with current trends in data availability and transparency, will further assist in the protection of public health and the environment, will improve compliance by facilitating the ability of regulated facilities to demonstrate compliance with requirements and by facilitating the ability of delegated state, local, tribal, and territorial air agencies and the EPA to assess and determine compliance, and will ultimately reduce burden on regulated facilities, delegated air agencies, and the EPA. Electronic

reporting also eliminates paper-based, manual processes, thereby saving time and resources, simplifying data entry, eliminating redundancies, minimizing data reporting errors, and providing data quickly and accurately to the affected facilities, air agencies, the EPA, and the public. Moreover, electronic reporting is consistent with the EPA's plan to implement Executive Order 13563 and is in keeping with the EPA's agency-wide policy developed in response to the White House's Digital Government Strategy. For more information on the benefits of electronic reporting, see the memorandum *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, referenced earlier in this section.

### 3. Other Changes

As mentioned above, we are also proposing four minor changes to major source NESHAP to clarify an applicability provision, update and clarify the testing requirements for PM, add a test method for mercury, and revise a definition. These changes are explained further in the following paragraphs.

The EPA is proposing to revise the applicability description under section 63.1441 to clarify that the NESHAP applies to major source smelting facilities that use any type of converter, not just batch converters because the current definition limits applicability to only major sources that use batch converters. The major source NESHAP should apply to any Primary Copper major source regardless of what type of converter they use. Therefore, we are proposing this change.

With regard to revisions to testing requirements, the Agency is proposing to revise the wording in section 63.1450 for clarification that the facilities must test for filterable particulate, not total particulate. The test methods in 63.1450(a) have not changed for PM from the existing regulation. The methods in the existing regulation (Methods 5, 5D, and 17) are methods for filterable PM. Total PM includes filterable PM and condensable PM. The condensable PM test method (Method 202) is not included in the existing regulation for the emission standards set in



2002. In addition, the Agency is proposing to add the appropriate test methods for mercury, PM10 and fugitive PM and updating test methods that are incorporated by reference because the affected facilities will need to know what test methods they need to use to demonstrate compliance with the new standards.

Finally, the EPA is proposing to revise the definitions under section 63.1459 by changing the term “smelting furnace” to “smelting vessel” to be consistent with the definition in the area source rule, subpart EEEEEEE because we think it is appropriate that both rules include the broader definition of smelting vessel, which is already in the area source rule. The specific definition is as follows: Smelting vessel means a furnace, reactor, or other type of vessel in which copper ore concentrate and fluxes are smelted to form a molten mass of material containing copper matte and slag. Other copper-bearing materials may also be charged to the smelting vessel.

*F. What compliance dates are we proposing?*

The EPA is proposing that existing facilities must comply with the BTF PM limits for the anode refining process fugitive roof vents within 2 years after promulgation of the final rule. The EPA is proposing 2 years for compliance because we expect the facility will need this much time to design and construct the necessary capture and control equipment described above. The reason the Agency is not proposing more than 2 years is because these controls are needed to achieve acceptable risks pursuant to CAA section 112(f), and section 112(f) only allows up to 2 years to comply with standards promulgated pursuant section 112(f).

For the new facility-wide mercury limits, new PM limits for anode refining point sources, and new PM limits for converter and smelting furnace roof vents, the Agency is proposing that existing facilities must comply within 1 year after promulgation of the final rule. For all other changes proposed in this action the Agency is proposing that existing facilities must comply within 180 days after promulgation of the final rule. All new or reconstructed facilities must comply with all requirements in the final rule upon startup. Our experience with similar

industries that are required to convert reporting mechanisms, install necessary hardware and software, become familiar with the process of submitting performance test results electronically through the EPA's CEDRI, test these new electronic submission capabilities, reliably employ electronic reporting, and convert logistics of reporting processes to different time-reporting parameters shows that a time period of a minimum of 90 days, but more typically 180 days, is generally necessary to successfully complete these changes. Our experience with similar industries further shows that this sort of regulated facility generally requires a time period of 180 days to read and understand the amended rule requirements, evaluate their operations to ensure that they can meet the standards during periods of startup and shutdown as defined in the rule and make any necessary adjustments, adjust parameter monitoring and recording systems to accommodate revisions, and update their operations to reflect the revised requirements.

From our assessment of the time frame needed for compliance with the revised requirements, the EPA considers the periods of 2 years, 1 year, and 180 days to be the most expeditious compliance period practicable for each of the standards described above, respectively, and, thus, is proposing that existing affected sources be in compliance with all of this regulation's revised requirements within these timeframes.

For the MACT floor PM limit, the EPA is proposing in the subpart QQQ rule for anode refining point sources, we are proposing a compliance period of 1 year. Although this is a new requirement, the major source facilities are currently meeting the limit and the Agency expects minimal impact.

For the proposed BTF limit for mercury for existing sources in subpart QQQ, the Agency is proposing a compliance period of 3 years. The EPA is providing 3 years to comply with the mercury standard because the facilities need time to hire a consultant to design the new control systems, establish contracts with construction companies and/or air pollution control installation experts to reconfigure equipment, and build and install new duct work, fans, and control systems.

The facilities also need time to establish contracts with testing companies and arrange for and conduct the performance testing.

For affected facilities that commence construction or reconstruction after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, owners or operators must comply with all requirements of the subpart, including all the amendments being proposed, no later than the effective date of the final rule or upon startup, whichever is later.

For the proposed subpart QQQ PM standard for new converters, the Agency is proposing that all new or reconstructed facilities must comply with this requirement upon startup. As no new converters are expected to come online in the near future, the Agency does not expect there to be an issue with the proposed compliance period.

## **V. Summary of Cost, Environmental, and Economic Impacts**

### *A. What are the affected sources?*

The Primary Copper Smelting source category includes any facility that uses a pyrometallurgical process to extract copper from copper sulfide ore concentrates, native ore concentrates, or other copper bearing minerals. There are currently three copper smelting facilities in the United States: two are major sources and one is an area source. No new copper smelting facilities are currently being constructed or are planned in the near future.

#### **1. 40 CFR Part 63, Subpart QQQ**

The affected sources subject to 40 CFR part 63, subpart QQQ, the major source NESHAP, are copper concentrate dryers, smelting furnaces, slag cleaning vessels, copper converter departments, and fugitive emission sources.

#### **2. 40 CFR Part 63, Subpart EEEEEEE**

Under 40 CFR part 63, subpart EEEEEEE, the area source NESHAP, the affected sources are copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plant, secondary gas systems, anode refining furnaces, and anode shaft furnaces.

### *B. What are the air quality impacts?*

## 1. 40 CFR Part 63, Subpart QQQ

The proposed amendments in this action would achieve about 4.26 tpy reduction of HAP metals emissions (primarily lead, arsenic and cadmium from anode refining operations and mercury from furnaces and converters). In this action, the Agency is also proposing additional work practices that the Agency thinks will achieve some additional unquantified HAP emissions reductions. These proposed amendments will also reduce risks to public health and the environment, as described above in this preamble.

Furthermore, the Agency is proposing new standards for process fugitive PM emissions from furnaces and converters. The EPA does not expect to achieve reductions in emissions with these new standards. However, these standards will ensure that the emissions remain controlled and minimized moving forward. The proposed amendments also include removal of the SSM exemptions.

## 2. 40 CFR Part 63, Subpart EEEEEEE

There are no air quality impacts resulting from the proposed amendments under 40 CFR part 63, subpart EEEEEEE.

### *C. What are the cost impacts?*

## 1. 40 CFR Part 63, Subpart QQQ

As described above, the proposed standards for anode refining process fugitive emissions and BTF standard for mercury will require estimated capital costs of \$7,331,000 and annualized costs of \$2,299,000 for the Freeport facility (2019 dollars). The Asarco facility will incur estimated costs of about \$95,000 per year to complete compliance testing for all the proposed emissions standards. Freeport already conducts annual testing of these units pursuant to state ADEQ requirements; therefore, the Agency does not expect Freeport to incur new testing costs. With regard to the proposed electronic reporting requirements, which will eliminate paper-based manual processes, the EPA expects a small initial unquantified cost to transition to electronic

reporting, but that these costs will be offset with savings over time such that ultimately there will be an unquantified reduction in costs to the affected facilities.

## 2. 40 CFR Part 63, Subpart EEEEEEE

With regard to the proposed electronic reporting requirements, which will eliminate paper-based manual processes, the EPA expects a small initial unquantified cost to transition to electronic reporting, but that these costs will be offset with savings over time such that ultimately there will be an unquantified reduction in costs to the affected facilities.

### *D. What are the economic impacts?*

## 1. 40 CFR Part 63, Subpart QQQ

The net present value of the estimated cost impacts of the proposed revisions to the Primary Copper Smelting NESHAP is \$18.2 million, discounted at a 7 percent rate over an 8-year analytic time frame from 2022 to 2029 in 2019 dollars. Using a 3 percent discount rate, the net present value of the estimated cost impacts is \$19.6 million.

As described previously in this preamble, the Agency estimates the new standards for anode refining fugitive emissions and mercury will result in annualized costs of about \$2.3 million for the Freeport facility. Based on our research, the estimated annualized costs for Freeport are about 0.016 percent of the annual revenue of the facility's ultimate parent company in 2019. For the Asarco facility, the estimated annualized costs of the proposed rule (*i.e.*, \$95,000 in testing costs) were less than 0.01 percent of 2019 revenues for the facility's ultimate parent company. Financial data was not available for the individual facilities.

We have data which estimates that the amount of copper produced by U.S. smelters was 563,000 metric tons in 2016 and 315,000 metric tons in 2020.<sup>33</sup> This decrease may have been in part due to the fact that Asarco's smelting operation was shut down for the entire year of 2020 and could have been further impacted by labor and supply issues related to COVID-19. We are

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<sup>33</sup> *USGS National Minerals Information Center – Copper Statistics and Information* available at: <https://www.usgs.gov/centers/nmic/copper-statistics-and-information>

not able to determine exactly how much the three U.S. facilities produced individually or the share of the domestic market they represent. Furthermore, we do not have the detailed information needed to determine what percentage of the copper consumed in the U.S. comes from these facilities as opposed to being imported, how much of the production of these facilities is exported, or what the market impacts would be.

The economic impacts of this proposed rule were determined by comparing the annualized costs estimated for each facility to the annual revenues of the facility's ultimate parent company to obtain cost to sales ratios. This is EPA's typical method for determining economic impacts, because parent companies are assumed to be able to shift resources across their operations to address regulatory compliance needs. Since the estimated cost impacts for the facilities' ultimate parent companies are minimal, EPA anticipates there to be no significant economic impacts on the individual facilities due to the proposed revisions.

## 2. 40 CFR Part 63, Subpart EEEEEEE

There are no significant economic impacts anticipated due to the proposed revisions under 40 CFR part 63, subpart EEEEEEE.

### *E. What are the benefits?*

## 1. 40 CFR Part 63, Subpart QQQ

As described above, the proposed amendments would result in significant reductions in emissions of HAP metals, especially lead and arsenic. The proposed amendments also revise the standards such that they apply at all times, which includes SSM periods. Furthermore, the proposed requirements to submit reports and test results electronically will improve monitoring, compliance, and implementation of the rule.

## 2. 40 CFR Part 63, Subpart EEEEEEE

The proposed amendments under 40 CFR part 63, subpart EEEEEEE revise the standards such that they apply at all times, which includes SSM periods. Furthermore, the proposed requirements to submit reports and test results electronically will improve monitoring,

compliance, and implementation of the rule.

## **VI. Request for Comments**

The EPA solicits comments on this proposed action. In addition to general comments on this proposed action, the Agency is also interested in additional data that may improve the emissions estimates, risk assessments, control and cost impacts analyses, and other analyses. The EPA is specifically interested in receiving any improvements to the data used in the site-specific emissions profiles used for risk modeling. Such data should include supporting documentation in sufficient detail to allow characterization of the quality and representativeness of the data or information. Section VII of this preamble provides more information on submitting data. The EPA is also specifically interested in receiving comments and data on the economic impacts of the proposed rule changes to individual facilities.

## **VII. Submitting Data Corrections**

The site-specific emissions profiles used in the source category risk and demographic analyses and instructions are available for download on the RTR website at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air>. The data files include detailed information for each HAP emissions release point for the facilities in the source category.

If you believe that the data are not representative or are inaccurate, please identify the data in question, provide your reason for concern, and provide any “improved” data that you have, if available. When you submit data, the Agency requests that you provide documentation of the basis for the revised values to support your suggested changes. To submit comments on the data downloaded from the RTR website, complete the following steps:

1. Within this downloaded file, enter suggested revisions to the data fields appropriate for that information.

2. Fill in the commenter information fields for each suggested revision (*i.e.*, commenter name, commenter organization, commenter email address, commenter phone number, and revision comments).

3. Gather documentation for any suggested emissions revisions (*e.g.*, performance test reports, material balance calculations).

4. Send the entire downloaded file with suggested revisions in Microsoft® Access format and all accompanying documentation to Docket ID No. EPA-HQ-OAR-2020-0430 (through the method described in the **ADDRESSES** section of this preamble).

5. If you are providing comments on a single facility or multiple facilities, you need only submit one file for all facilities. The file should contain all suggested changes for all sources at that facility (or facilities). The Agency requests that all data revision comments be submitted in the form of updated Microsoft® Excel files that are generated by the Microsoft® Access file. These files are provided on the project website at <https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air>.

## **VIII. Incorporation by Reference**

The EPA proposes to amend 40 CFR 63.14 to incorporate by reference for three VCS.

- ANSI/ASME PTC 19.10-1981, Flue and Exhaust Gas Analysis [Part 10, Instruments and Apparatus], issued August 31, 1981, IBR requested for 40 CFR 63.1450(a)(iii), (b)(iii), (d)(iii), and (e)(iii). This method is an approved alternative to EPA Method 3B manual portion only, not the instrumental portion. The applicable portion of this Performance Test Code is the wet chemical manual procedures, apparatus and calculations for quantitatively determining oxygen, carbon dioxide, carbon monoxide and nitrogen from stationary combustion sources.
- ASTM D7520-16, Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere, approved April 1, 2016, IBR requested for 40 CFR 63.1450(e)(1)(vii). This method is an acceptable alternative to the EPA's Method 9 under



specific conditions stated in 40 CFR 63.1450(e)(1)(vii). This test method described the procedures to use the Digital Camera Opacity Techniques (DCOT) to obtain and interpret the digital images in determining and reporting plume opacity. It also describes procedures to certify the DCOT.

- ASTM D6784-02, (Reapproved 2008), Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), Approved April 1, 2008. IBR requested for 40 CFR 63.1450(d)(1)(v). This method is an acceptable alternative to the EPA's Method 29 as a method for measuring mercury and applies to concentrations approximately from 0.5 to 100  $\mu\text{g}/\text{Nm}^3$ . This test method describes equipment and procedures for obtaining samples from effluent ducts and stacks, equipment and procedures for laboratory analysis, and procedures for calculating results.

The ANSI/ASME document is available from the American Society of Mechanical Engineers (ASME) at <http://www.asme.org>; by mail at Two Park Avenue, New York, NY 10016-5990; or by telephone at (800) 843-2763. The ASTM documents are available from the American Society for Testing and Materials (ASTM) at <https://www.astm.org>; by mail at 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; or by telephone at (610) 832-9500.

## **IX. Statutory and Executive Order Reviews**

Additional information about these statutes and Executive Orders can be found at <https://www.epa.gov/laws-regulations/laws-and-executive-orders>.

### *A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review*

This action is a significant regulatory action that was submitted to OMB for review. Any changes made in response to OMB recommendations have been documented in the docket (Docket ID No. EPA-HQ-OAR-2020-0430).

## *B. Paperwork Reduction Act (PRA)*

### 1. 40 CFR Part 63, Subpart QQQ

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The information collection request (ICR) document that the EPA prepared has been assigned EPA ICR number 1850.10. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The EPA is proposing amendments that require electronic reporting of results of performance tests and CEMS performance evaluations, fugitive dust plans and notification of compliance reports, remove the requirement to submit certain information related to the malfunction exemption, and impose other rule revisions that affect reporting and recordkeeping requirements for primary copper smelting facilities, such as requirements to submit new performance test reports and to maintain new operating parameter records to demonstrate compliance with new standards. This information would be collected to assure compliance with 40 CFR part 63, subpart QQQ.

*Respondents/affected entities:* Owners or operators of primary copper smelting facilities.

*Respondent's obligation to respond:* Mandatory (40 CFR part 63, subpart QQQ).

*Estimated number of respondents:* Two (total).

*Frequency of response:* Initial, semiannual, and annual.

*Total estimated burden:* The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be 5,500 hours (per year). Burden is defined at 5 CFR 1320.3(b).

*Total estimated cost:* The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be \$750,000 (per year), of which \$130,000 is for this rule, and \$620,000 is for the other costs related to continued compliance with the NESHAP. There are no annualized capital or operation & maintenance costs.

### 2. 40 CFR Part 63, Subpart EEEEEEE

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The ICR document that the EPA prepared has been assigned EPA ICR number 2240.07. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The EPA is proposing amendments that require electronic reporting of results of performance tests and CEMS performance evaluations and notification of compliance reports, remove the malfunction exemption, and impose other revisions that affect reporting and recordkeeping for primary copper smelting facilities. This information would be collected to assure compliance with 40 CFR part 63, subpart EEEEEEE.

*Respondents/affected entities:* Owners or operators of primary copper smelting facilities.

*Respondent's obligation to respond:* Mandatory (40 CFR part 63, subpart EEEEEEE).

*Estimated number of respondents:* One (total).

*Frequency of response:* Initial, semiannual, and quarterly.

*Total estimated burden:* The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be 9 hours (per year). Burden is defined at 5 CFR 1320.3(b).

*Total estimated cost:* The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be \$1,060 (per year). There are no annualized capital or operation & maintenance costs.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden to the EPA using the docket identified at the beginning of this rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs via email to

*OIRA\_submission@omb.eop.gov*, Attention: Desk Officer for the EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments no later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA will respond to any ICR-related comments in the final rule.

*C. Regulatory Flexibility Act (RFA)*

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. Based on the Small Business Administration size category for this source category, no small entities are subject to this action.

*D. Unfunded Mandates Reform Act (UMRA)*

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

*E. Executive Order 13132: Federalism*

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

*F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments*

This action does not have tribal implications as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this action. However, consistent with the EPA policy on coordination and consultation with Indian tribes, the EPA will offer government-to-government consultation with tribes as requested.

*G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks and 1 CFR Part 51*

This action is not subject to Executive Order 13045 because the EPA does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are contained in sections III and IV of this preamble and further documented in the document titled *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*, which is available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430).

*H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. As described in more details in sections IV.A and V.D of this preamble, new standards are proposed for 40 CFR part 63, subpart QQQ to limit mercury emissions, and PM emissions from anode refining furnaces and process roof vents. The proposed limits would have minimal impacts on the affected facilities because they mostly already meet the limits. One facility will have to improve their capture and control systems, which they were already planning to do as referenced in a consent order with the state of Arizona.

*I. National Technology Transfer and Advancement Act (NTTAA)*

This rulemaking involves technical standards. Therefore, the EPA conducted searches for National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review through the Enhanced NSSN Database managed by the American National Standards Institute (ANSI). The Agency also contacted VCS organizations and accessed and searched their databases. Searches were conducted for the EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 3, 3A, 3B, 4, 5, 5B, 9, 17, 22, 29, 30A, 30B of 40 CFR part 60, appendix A, and EPA Method 201A

appendix M, 40 CFR part 51. No applicable VCS were identified for EPA Methods 1A, 2A, 2D, 2F, 2G, 5B, 5D, 22, 30A, 30B.

During the search, if the title or abstract (if provided) of the VCS described technical sampling and analytical procedures that are similar to the EPA's reference method, the EPA considered it as a potential equivalent method. All potential standards were reviewed to determine the practicality of the VCS for this rule. This review requires significant method validation data which meets the requirements of the EPA Method 301 for accepting alternative methods or scientific, engineering and policy equivalence to procedures in the EPA reference methods. The EPA may reconsider determinations of impracticality when additional information is available for particular VCS.

Three VCS were identified as an acceptable alternative to the EPA test methods for the purposes of this rule. The VCS ANSI/ASME PTC 19-10-1981 Part 10 (2010), "Flue and Exhaust Gas Analyses" is an acceptable alternative to the EPA Method 3B manual portion only and not the instrumental portion. The ANSI/ASME PTC 19-10-1981 Part 10 (2010) method incorporates both manual and instrumental methodologies for the determination of O<sub>2</sub> content. The manual method segment of the O<sub>2</sub> determination is performed through the absorption of O<sub>2</sub>. The VCS ASTM D7520-16 "Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere" is an acceptable alternative to the EPA Method 9 with the following conditions:

1. During the digital camera opacity technique (DCOT) certification procedure outlined in section 9.2 of ASTM D7520-16, you or the DCOT vendor must present the plumes in front of various backgrounds of color and contrast representing conditions anticipated during field use such as blue sky, trees, and mixed backgrounds (clouds and/or a sparse tree stand).
2. You must also have standard operating procedures in place including daily or other frequency quality checks to ensure the equipment is within manufacturing specifications as outlined in section 8.1 of ASTM D7520-16.

3. You must follow the record keeping procedures outlined in §63.10(b)(1) for the DCOT certification, compliance report, data sheets, and all raw unaltered JPEGs used for opacity and certification determination.
4. You or the DCOT vendor must have a minimum of four (4) independent technology users apply the software to determine the visible opacity of the 300 certification plumes. For each set of 25 plumes, the user may not exceed 15 percent opacity of anyone reading and the average error must not exceed 7.5 percent opacity.
5. This approval does not provide or imply a certification or validation of any vendor's hardware or software. The onus to maintain and verify the certification and/or training of the DCOT camera, software and operator in accordance with ASTM D7520-16 and this letter is on the facility, DCOT operator, and DCOT vendor.

The VCS ASTM D6784-02(2008) reapproved, "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)" is an acceptable alternative to the EPA Methods 101A and Method 29 (portion for mercury only) as a method for measuring mercury applies to concentrations approximately  $0.5 - 100 \mu\text{g}/\text{Nm}^3$ . The ASTM D6784-02 method is used to determine elemental, oxidized, particle-bound and total mercury emissions from coal-fired stationary sources with concentrations ranging from approximately 0.05 to 100 ug/dscm.

The search identified 189 VCS that were potentially applicable for these rules in lieu of the EPA reference methods. After reviewing the available standards, the EPA determined that 199 candidate VCS (ASTM D3154-00 (2014), ASTM D3464-96 (2014), ASTM 3796-09 (2016), ISO 10780:1994 (2016), ASME B133.9-1994 (2001), ISO 10396:(2007), ISO 12039:2001(2012), ASTM D5835-95 (2013), ASTM D6522-11, CAN/CSA Z223.2-M86 (R1999), ISO 9096:1992 (2003), ANSI/ASME PTC-38-1980 (1985), ASTM D3685/D3685M-98-13, CAN/CSA Z223.1-M1977, ISO 10397:1993, ASTM D6331 (2014), EN13211:2001, CAN/CSA Z223.26-M1987) identified for measuring emissions of pollutants or their surrogates

subject to emission standards in the rule would not be practical due to lack of equivalency, documentation, validation data and other important technical and policy considerations. Additional information for the VCS search and determinations can be found in the memorandum, *Voluntary Consensus Standard Results for National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review*, which is available in the docket for this action.

Under 40 CFR 63.7(f) and 40 CFR 63.8(f) of subpart A of the General Provisions, a source may apply to the EPA to use alternative test methods or alternative monitoring requirements in place of any required testing methods, performance specifications or procedures in the final rule or any amendments.

The EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially applicable VCS and to explain why such standards should be used in this regulation.

*J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

Executive Order 12898 (59 FR 7629, February 16, 1994) directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The EPA believes that this proposed action would not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898.

The EPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the



development, implementation, and enforcement of environmental laws, regulations, and policies. The EPA further defines the term fair treatment to mean that “no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies.”<sup>34</sup> In implementing its environmental justice-related efforts, the Agency has expanded the concept of fair treatment to consider not only the distribution of burdens across all populations, but also the distribution of reductions in risk from EPA actions, when data allow.<sup>35</sup> As described in section IV.B.7 of this action and shown in Table 3, EPA evaluated the demographic characteristics of communities located near the major source facilities and determined that elevated cancer risks associated with emissions from these facilities disproportionately affect Native American, Hispanic, Below Poverty Level and Over 25 without High School Diploma individuals living nearby. As part of its environmental justice analysis, EPA evaluated whether the proposed action for the Primary Copper Smelting Major Source Category would address the existing disproportionately high and adverse human health effect on these individuals and EPA further evaluated the projected distribution of reductions in risk resulting from the proposed action.

This proposed action is projected to reduce the number of individuals in these groups who live in proximity of the Freeport facility that have risk equal to or greater than 1-in-1 million. EPA estimates that there are approximately 24,412 people within 50 km of the Freeport facility with risk equal to or greater than 1-in-1 million (prior to controls); an estimated 6,835 of these people are Native American, 7,812 are Hispanic or Latino, and 6,591 are individuals below the poverty level. However, as described in section IV.B, we also estimate that no person has an

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<sup>34</sup> U.S.EPA. Office of Environmental Justice *Plan EJ 2014*, September 2011. Available at <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100DFCQ.PDF?Dockey=P100DFCQ.PDF>

For more information, see the EPA’s Environmental Justice website, <http://www.epa.gov/environmentaljustice/>

<sup>35</sup> U.S. EPA. June 2016. *Technical Guidance for Assessing Environmental Justice in Regulatory Actions*. Available at: [https://www.epa.gov/sites/production/files/2016-06/documents/ejtg\\_5\\_6\\_16\\_v5.1.pdf](https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf)

increased cancer risk greater than 90-in-1 million. This proposed action would reduce the number of Native American individuals with cancer risk equal to or above 1-in-1 million to an estimated 2,724, would reduce the number of Hispanic or Latino individuals with cancer risk equal to or above 1-in-1 million to an estimated 7,198, and would reduce the number of individuals below the poverty level with cancer risk equal to or above 1-in-1 million to an estimated 4,475. There would be no reduction in the number of individuals with modeled cancer risk greater than 1-in-1 million at Asarco, since EPA estimates the proposed limit will achieve no quantified emissions reductions for Asarco.

Based upon these reductions, approximately 20,566 people within a 50-km radius of the modeled facilities would be exposed to a cancer risk greater than or equal to 1-in-1 million as a result of emissions from Primary Copper Smelting post-control source category operations. This represents a 21 percent reduction in the total population at risk when compared to actual emissions without controls. Furthermore, as described in section IV.C.3, after implementation of this proposed action, the maximum modeled lifetime increased cancer risk due to HAP emissions from the two major source primary copper smelting facilities for any individual is estimated to be 60-in-1 million. The demographic analysis based on post-control emissions is provided in the report *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*, available in docket EPA-HQ-OAR-2020-0430, part of the rules and guidelines for 40 CFR part 63, subpart QQQ).

The above risk-based demographic report indicates that for the major source category as a whole there will be a reduction in average cancer risk for each demographic group within a 50 kilometer radius of the modeled facilities as a result of proposed standards to reduce emissions at the Freeport facility, specifically: Hispanic or Latino (4-in-1 million to 3-in-1 million); Native American (2-in-1 million to 1-in-1 million); African American (10-in-1 million to 5-in-1 million); Other and Multiracial (5-in-1 million to 3-in-1 million); people living below the poverty level (4-in-1 million to 2-in-1 million); people 25 years old and older without a high

school diploma (4-in-1 million to 2-in-1 million); and people living in linguistic isolation (4-in-1 million to 2-in-1 million). For the total population exposed to emissions from the major source category, average cancer risk would be reduced from 4-in-1 million to 2-in-1 million.

This action's health and risk assessments and related decisions are described in section IV of this action. The detailed documentation for these assessments is contained in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*. The methodology and the results of the baseline and post-control demographic analyses are presented in the technical reports, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Source Category Operations* and *Risk and Technology Review - Analysis of Demographic Factors For Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*, respectively. These reports are available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430).

#### **List of Subjects in 40 CFR Part 63**

Environmental protection, Air pollution control, Hazardous substances, Incorporation by reference, Reporting and recordkeeping requirements.

**Michael S. Regan,**

*Administrator.*

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